THE MASSACHUSETTS COLLEGE OF
PHARMACY & ALLIED HEALTH SCIENCES PROJECT
179 LONGWOOD AVENUE
BOSTON, MASSACHUSETTS

FINAL PROJECT IMPACT REPORT/ FINAL ENVIRONMENTAL IMPACT REPORT

EOEA #9309

JUNE 1, 1993

MASSACHUSETTS COLLEGE OF PHARMACY AND ALLIED HEALTH SCIENCES

Submitted To:

BOSTON REDEVELOPMENT AUTHORITY
1 City Hall Square
Boston, MA 02201

and

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
MEPA Unit
100 Cambridge Street
Boston, MA 02202

Submitted By:

MASSACHUSETTS COLLEGE OF PHARMACY & ALLIED HEALTH SCIENCES
179 Longwood Avenue
Boston, MA 02115

HMM Associates, Inc.
A Summit Company

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street, Boston, 02202

WILLIAM F. WELD
GOVERNOR

ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR

TRUDY COXE
SECRETARY

Tel: (617) 727-9800
Fax: (617) 727-2754

May 26, 1993

Mr. Mitchell Fischman
HMM Associates, Inc.
196 Baker Avenue
Concord, MA 01742

Re: EOEA #9309 Massachusetts College of Pharmacy
Late Comments on Draft Environmental Impact Report

Dear Mr. Fischman:

This office has recently been given the enclosed comment on the above referenced project. Apparently, there was some confusion on the part of its authors, Kathryn and Oscar Brookins, about the thirty day comment period under MEPA. Based on a phone conversation Mrs. Brookins and Jacki Wilkins last week, the Brookins believed that the thirty day comment period started on April 22, 1993, when representatives of the project met with residents of the Mission Hill community. In addition, I am aware of extenuating health considerations in the Brookins family during the time that the project was under review by this office.

For both reasons, I am forwarding a copy of the Brookins' comment letter on the Draft EIR and request that you and your client include it in the Final EIR, responding to the issues it raises, as appropriate.

Sincerely,

Richard Foster

Richard Foster, Acting Director
MEPA Unit

Enclosures

RF/JIW/jw

May 22, 1993
4 Hillside Street
Boston, MA 02120-3348

RECEIVED
MAY 2 4 1993
MEPA

Ms. Trudy Coxe, Secretary
Ms. Jacki Wilkins
Commonwealth of Massachusets
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, MA 02202

RE:EOEA #9309 Mass College of Pharmacy

Dear Secretary Coxe and Ms. Wilkins:

This letter is in response to the DEIR for the above project, your letter of May 14, 1993 and a meeting with the developers held on April 22, 1993.

First, your characterization of the location of the project as "...across the street from Boston Latin High School." is in error and significantly so. The project proposed is abutting the Boston Latin School site separated only by a narrow driveway along much of the project's length and along other portions by a driveway and parking spaces. The proximity as an abutting parcel carries substantially greater impact than would separation by an existing street's width. Your inability to discern the actual location of the site is, perhaps, testimony that the specifics of the project presented in the developer's, narrative, site plans and drawings are inadequate for determining its environmental impacts visually. Once built its proximity would be glaringly obvious; Boston Latin and the College are next door neighbors!

Second, the developer argues that the proposed size of the project is necessary "... because it satisfied its [the College's] programmatic requirements and needs." (DEIR I-3.20 and several other places therein.) The College makes no attempt to rationalize or substantiate this bold claim. If this is the driving force behind the project, then supporting evidence is needed, otherwise this claim is nothing more than a hollow platitude inserted to elicit approval and forestall documentation. Whatever the "programmatic requirements and need" this project meets at the College are, at best, vaguely alluded to in the report.

Essentially their argument hinges on the financial necessity of their being able to construct and lease a tax exempt project of their stated size and otherwise it would not pay them to build classrooms, offices and dormitory rooms solely for the institution's uses. However, there is nothing inherent in property rights which supports the notion that

citizens have an obligation, via waiving zoning regulations and other protections from negative spillovers of projects, to assure the College can financially profit from the use of its being permitted to build. The College insists that it must be allowed to build lab spaces for lease to make money to assure its survival. Such an argument, if adopted means there will hardly ever be constraints on a property developer, even if significant adverse spillovers impact the neighboring streets and environment. Surely if environmental protection is to mean anything it cannot become the servant of such a philosophy.

Furthermore, if financial considerations are of such importance to the developer, why then is there nothing in the DEIR detailing the financial considerations driving the project? As taxpayers are we obliged to permit a tax-exempt institution to use its status to become commercial developers? No, tax-exempt status is bestowed to permit socially desirable activities from withering away in the face of onerous taxation; however, this exemption must be balanced by an offsetting benefit to society and profit-making is not a qualifying activity. The College does not make a convincing case that this project qualifies it for consideration on this account.

Third, your request for a firm number of parking spaces is certainly warranted; however, you should be aware that under existing zoning (H-3) which underlies the current institutional use of the site prohibits construction of a garage for use by persons other than residents. See Boston Zoning Code Section 8-7 (59) and Enabling Act which states that a parking garage would be a "C*" use. C* means that a garage would be a <u>conditional allowed use</u>, ". . .Provided that the parking garage is operated exclusively for the parking of motor vehicles (other than trucks) of persons living in the neighborhood." The planned use in this project does not satisfy the exclusivity criterion referenced in the Zoning Code. The developer has not detailed all pertinent zoning as per the request for a DEIR. It has largely been the ignoring of this section of the Code which has made the Mission Hill Medical Area such a congested and environmentally non-conforming area in the neighborhood. The developer would at least be required to obtain a zoning variance to construct the garage specified in the DEIR.

Fourth, the developer has not provided information on the disposition of the dormitory spaces which would be vacated, nor is there any information regarding the disposition of the laboratory spaces which would be vacated if the project is completed and leased to Brigham and Women's Hospital. Both sites are within the same vicinity of the proposed project and presumably will have potentially adverse impacts on the community.

Fifth, placing 175 students in dormitory spaces on a site which will have no open space for their use is inappropriate. If the developer were contemplating constructing an apartment complex of this size zoning regulations would not allow the construction on such a site having virtually no open space. Even if one were to consider paved parking spaces "open" the site would not comply. Surely college students need such minimal environmental amenities as much, if not considerably more, than apartment dwellers. The students will be 24-hour residents on the site.

In our discussion with the staff and consultants of the MCP we found that they were not honest in their presentations of the facts concerning their construction project. Simple matters such as how close to their property line the zoning code would allow them to build resulted in their telling lies, which became apparent when we requested they do the arithmetic of the code requirements. At any rate an 8 story building 17 ft. from the property line of a school or 23 ft. did not seem to be significant to them. The moving force in this construction project is the Brigham and Women's Hospital, MCP is simply acting on their behalf, and acting irresponsibly as well.

The proliferation of parking and traffic in the medical area, simply must cease. If the developer is permitted to proceed according to proposed plans without there being significant mitigation of conditions and facts giving rise to the above issues, the environment in Mission Hill will be further harmed and the future of one of America's <u>best high schools</u> compromised.

I request that you mitigate the ill effects this project carries for the citizens of the Commonwealth by having the College build only the space it needs for its own use and not become a developer building for commercial leasing.

Sincerely yours,

Oscar T. Brookins

Oscar T. Brookins

Kathryn J. Brookins

Kathryn J. Brookins

[illegible] Hillside [illegible]
Roxbury, [illegible] [illegible]12
May 24, 197[illegible]

Dear Ms. Wilkins,

Thank you for your consideration in the matter of the Mass. College of Pharmacy.

I had major surgery on March 31, 1978, and a serious reaction to drugs on April 16. Since I still had an infection the time since the drug reaction has been spent fighting an infection with different drugs at low dosages looking for one that I could tolerate, at a dosage that cured the infection. My doctor is Nicholas Piccarello, of the Faulkner Hospital.

I hope that our comments will be of use in your decision. Enclosed are copies of the Mission Hill News which has devoted a considerable amount of space to the zoning issues which face our community.

Sincerely yours,

Kathryn J. Brookins

Kathryn J. Brookins

June 7, 1993

Richard Foster, Acting Director
MEPA Unit, Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

Massachusetts College of Pharmacy and Allied Health Sciences

179 Longwood Avenue
Boston, Massachusetts 02115
Telephone: 617.732.2800
Facsimile: 617.732.2801

RE: The Massachusetts College of Pharmacy and Allied Health Sciences Project, 179 Longwood Avenue, Boston, Massachusetts, EOEA #9039

Dear Mr. Foster:

On June 1, 1993 the College submitted a Final Environmental Impact Report for the Project, in response to the Secretary's Certificate on the Draft Environmental Impact Report for the Project which was issued on May 14, 1993. As the College's consultant, Mitchell Fischman of HMM Associates, Inc. was in the process of transmitting the FEIR for the Project to your office, he received your letter dated May 26, 1993. Attached to your letter was a copy of a letter from Oscar and Kathryn Brookins, which was received by your office following the close of the comment period and the issuance of the Secretary's Certificate on the DEIR. In your letter you requested that the FEIR include a copy of the Brookins' letter, and respond to the issues raised in the letter as appropriate.

Although it was not possible to include a copy of the Brookins letter within the FEIR, the College has provided a copy of this letter, with the Brookins' letter attached, to each person noted on the distribution list. Following our review of the Brookins' letter, the College and its consultants have determined that no revisions or additions to the FEIR are required in order to respond to the issues raised in the Brookins' letter. We have noted when the FEIR and DEIR address the concerns voiced by the Brookins in their letter, and have clarified certain issues raised by the Brookins in their letter which may result in some confusion to the reviewer.

The fact that the College's proposed project directly abuts Boston Latin School is clearly depicted, both verbally and graphically in the ENF, DEIR, and FEIR. In fact, the College has worked actively to respond to the concerns raised by Michael Contompasis, the Headmaster of the Boston Latin School, including those set forth in his letter to your office during your review of the ENF for the proposed Project. The favorable resolution of these concerns is evidence in his letter of May 26, 1993, a copy of which is attached and which was submitted as part of the FEIR, in which he indicates his support for the College's proposed Project.

The College's programmatic requirements and needs are well documented in the DEIR and FEIR, and in the College's Master Plan for Physical Facilities Development, which has been approved by the Mission Hill PZAC and the BRA. The College does not consider these documents to contain "hollow platitude(s) inserted to elicit approval and forestall documentation". The College is not seeking to obtain approval for its proposed Project by "waiving zoning regulations and other protection from negative spill overs of projects". The College has undertaken a comprehensive and thoughtful analysis of its needs and the effects of its development on the environment.

The College's proposed Project is not a "commercial development". Both the College and its proposed tenant, The Brigham and Women's Hospital, Inc., are non-profit institutions which can benefit from the economies of scale inherent in the Project, and from the research opportunities attendant to their joint location. The College will provide a detailed account of its financial situation in the process of applying to obtain BIDFA/MIFA financing for the Project. The College's contribution to the training and education of those in the fields of pharmacy and the allied health sciences, as well as to the improved health and treatment of those members of the Boston community, is well documented. The College's commitments to education and community service are set forth in the DEIR and FEIR.

As indicated in the FEIR, the number of parking spaces on site following construction of the Project will be reduced from the current number of 150 to 119-124. The Brookins misunderstood the zoning controls applicable to parking within an H-3 Zoning district. A parking garage which is accessory to a use such as a College or Hospital is allowed within the H-3 Zoning District,

and the restricted parking overlay district, provided that a conditional use permit is obtained to allow for the use. No variance from the use provisions applicable within the H-3 Zoning District is required for a use of this nature. (Please refer to Use Item #72, Table 8-7, of the Boston Zoning Code). More importantly, however, the zoning controls applicable to development within an H-3 Zoning District are not the zoning controls which will apply to the development of the College's Project. Both the DEIR and the FEIR provide a detailed description of the zoning controls which will apply within the College's Institutional District, which was approved by the BRA on May 27, 1993 and will be submitted for adoption by the Zoning Commission and the Mayor. The zoning controls applicable within this Institutional District are consistent with the zoning controls proposed to be in effect for the Longwood Medical Area as a whole.

With respect to the comment on the failure of the College to consider the effects of dormitory and laboratory space which will be vacated following occupancy of the Project, the analysis of the effects of the Project as set forth within the DEIR and FEIR is conservative. This analysis considers the cumulative effects of the new space and continued use of the current space on the community. The College has undertaken substantial commitments to mitigate any negative effect. The College is confident that the proposed Project will be one which will provide benefits to not only its students and tenants, but to the neighborhood as a whole.

It should also be noted that the College and its consultant, HMM Associates, Inc., met with the Brookins (as well as with Marie Fabiano) on April 22, 1993 to review comments raised by the Brookins and Marie Fabiano on the DEIR. The setback from the Boston Latin School property line with the alternatives evaluated were reviewed at that meeting as were other issues such as parking and traffic. Both the College and its consultants were honest and forthcoming in their responses to the Brookins and Marie Fabiano concerns. Any clarifications on the setback comparisons which may have continued from that meeting were provided in the FEIR, particularly Table I-2.1 (Summary of Alternatives Analysis and Comparisons to Existing Zoning Requirements) which clearly setforth a comparison of the alternatives with existing zoning requirements.

In closing, the College wishes to address the allegation made in the Brookins' letter that it and its consultants were "not honest in their presentation of the facts concerning their construction project." The College and its consultants have been forthcoming in their presentation to the community, which has resulted in a favorable and cooperative relationship with the College's direct abutters, including Boston Latin School, as well as with the College's neighbors, including the Mission Hill PZAC. We hope that the spirit of open communication and productive discussion which has begun during this permitting process will continue to grow and thrive.

Please do not hesitate to call upon me if you would wish any further information or clarification.

Sincerely,

Benjamin R. Hershenson

Benjamin R. Hershenson, Ph.D.
Vice President for Academic Affairs and
Dean of the College

HMM Associates, Inc.
A Summit Company

6650-301/ENV-9131

June 1, 1993

Dear Reviewer:

Enclosed is a Final Project Impact/Final Project Environmental Impact Report (FPIR/FEIR) for the Massachusetts College of Pharmacy and Allied Health Sciences Project proposed by the College at its 179 Longwood Avenue Site in Boston. The proposed Project involves the construction of approximately 233,850 gross square feet (approximately 171,251 gsf for FAR purposes in accordance with the Boston Zoning Code) in a New Building including a two-story base for classrooms, faculty offices and academic support space with a six-story structure above for a Research Facility and for the College's dormitory use. Two existing structures, the Newton and Garage/Office Buildings, currently located on-site, will be demolished to allow for the new construction.

Comments should be submitted to the MEPA office and addressed to:

Secretary: EOEA
100 Cambridge Street - Room 2000
Boston, MA 02202
ATTN: MEPA Unit, No. 9309
(617) 727-5830

If you have any questions, please call me.

Very truly yours,

HMM ASSOCIATES, INC.

Mitchell L. Fischman
Director of Environmental Planning

MLF:smn
Enclosure

196 Baker Avenue Concord MA 01742 508 371-4000 Fax 508 371-2468

The Massachusetts College of Pharmacy & Allied Health Sciences Project
179 Longwood Avenue
Boston, Massachusetts

FINAL PROJECT IMPACT REPORT / FINAL ENVIRONMENTAL IMPACT REPORT

EOEA #9309

June 1, 1993

Submitted to:

Boston Redevelopment Authority
1 City Hall Square
Boston, Massachusetts 02201

and

Executive Office of Environmental Affairs
MEPA Unit
100 Cambridge Street
Boston, Massachusetts 02202

Submitted by:

Massachusetts College of Pharmacy & Allied Health Sciences
179 Longwood Avenue
Boston, Massachusetts 02115

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I. EXECUTIVE SUMMARY

I. EXECUTIVE SUMMARY

1.0 INTRODUCTION/ENVIRONMENTAL STATUS

The Massachusetts College of Pharmacy and Allied Health Sciences (the "College") is a private, independent college, founded in 1823 and located at 179 Longwood Avenue in Boston's Longwood Medical Area. The College's main campus, the site of the Project, is bounded by Longwood Avenue, Palace Road, the Boston Latin School, and the Brigham and Women's Hospital's Longwood Medical Research Center (LMRC). The College has approximately 1,325 full-time students and offers bachelor degree programs and post-graduate programs in pharmacy and related health-care fields.

A Project Notification Form (PNF) was filed with the Boston Redevelopment Authority (BRA) on January 13, 1993 which discussed initial Project plans and effects.

An Environmental Notification Form (ENF) was filed with the Secretary of the Executive Office of Environmental Affairs (EOEA) on February 1, 1993. The ENF was assigned EOEA Number 9309. Its availability was published in *The Environmental Monitor* on February 9, 1993. A Consultation Session to review the Project was held at EOEA's offices on March 3, 1993.

The joint Draft Project Impact Report (DPIR) and Draft Environmental Impact Report (DEIR) was submitted on March 31, 1993 at the request of the BRA and the Secretary of Environmental Affairs' MEPA Unit (MEPA) in order to provide a summary of the College's Project and its effects. The College presented the information for the Project in the DPIR/DEIR in accordance with the BRA Scoping Determination of February 16, 1993 (see Appendix A) and the Certificate of the Secretary of EOEA dated March 11, 1993 on the ENF (see Appendix B).

The Project described in the DPIR/DEIR was modified from the PNF/ENF submissions to respond to concerns of BRA Design Staff. It also responded to BRA comments that proposed on-site parking be reduced. The DPIR/DEIR included a discussion of alternatives to the proposed Project, as requested by the Secretary's Certificate on the ENF.

The Preliminary Adequacy Determination (PAD) on the DPIR for the Project was issued by the BRA on May 21, 1993 (see Appendix C). According to the PAD, the DPIR was considered sufficient by the BRA to satisfy its February 16, 1993 Scoping Determination, except with respect to additional materials and/or details which the Project Proponent has included in the FPIR/FEIR, as set forth in the PAD.

The Certificate of the Secretary of EOEA issued on May 14, 1993 indicated that the DEIR was adequate and properly complied with MEPA and its implementing regulations (see Appendix D). The Certificate included a request for additional information which is provided in this FPIR/FEIR.

2.0 CHANGES TO THE PROJECT AND A BRIEF PROJECT DESCRIPTION

2.1 Changes to the Project Since the DPIR/DEIR

The College has continued to refine aspects of the Project's design. These refinements have resulted from the normal design development process, in response to community review, and discussions with the Boston Civic Design Commission (BCDC). (The FPIR/FEIR proposed design was approved by the BCDC on May 4, 1993 and the BRA on May 27, 1993.)

Refinement of Schematic Design Plans

Drawings of the preferred design (Alternative B) have been revised to incorporate improvements resulting from the review of the Project by the BCDC and BRA Staff. These improvements have included the redesign of the Longwood Avenue frontage, whereby the existing parking lots will be reduced in size and reconfigured to increase the area for pedestrians and planting. The new parking areas will be repaved with attractive masonry paving, and new signage will be provided. The parking capacity of these Longwood Avenue lots will be reduced to 28 spaces from the current capacity of 50. The garage has similarly been reduced to 91 to 96 spaces leading to an overall reduction of on-site parking from 150 to 119-124 spaces. The floor area of the service level as described in the DPIR/DEIR has modestly increased in size. Due to a reduction of floor area elsewhere in the project, however, the overall Floor Area Ratio (FAR) for the Project has decreased and the FAR for the Site as a whole will remain less than 3.0. The College's Schematic Design Plans were approved by the BRA on May 27, 1993.

Community Review

Following submission of the DPIR/DEIR on March 31, 1993, the College organized and attended briefings with: abutters to the Site (including Boston Latin High School, Massachusetts College of Art, and Harvard Medical School), individuals from the local community submitting letters on the DPIR/DEIR (including Marie Fabiano, and Kathryn and Oscar Brookins), and community organizations (Mission Hill PZAC and Fenway Community Development Group.). Project changes resulting from these discussions include the following:

- Increased signage and monitoring to assure that commercial service vehicles will not be allowed to unload in front of the College along Longwood Avenue thereby reducing traffic congestion and safety hazards to pedestrians and bicyclists. (The College will also limit loading to the new covered loading area under the New Building, accessed from Palace Road.)

- Support and cooperation in snow removal on the Boston Latin High School driveway at the rear of the Site during the winter months.
- Additional employment and housing related initiatives incuding a housing and job linkage contribution of approximately $229,000 and the establishment of a College PILOT (Payment-In-Lieu of Taxes) agreement with a total value of $104,000 that will also provide a full scholarship for a City of Boston Resident.

2.2 Brief Project Description

2.2.1 Site Location

The College Campus (the "Site") is an approximate 2.0± acre lot, located at 179 Longwood Avenue in Boston, Massachusetts. It is located in the Longwood Medical Area (LMA), and bounded by Longwood Avenue to the south, Palace Road to the east, Boston Latin School to the north, and Brigham and Women's Hospital's LMRC to the west (see Figure I-2.1, Site Locus Map).

2.2.2 Proposed Project

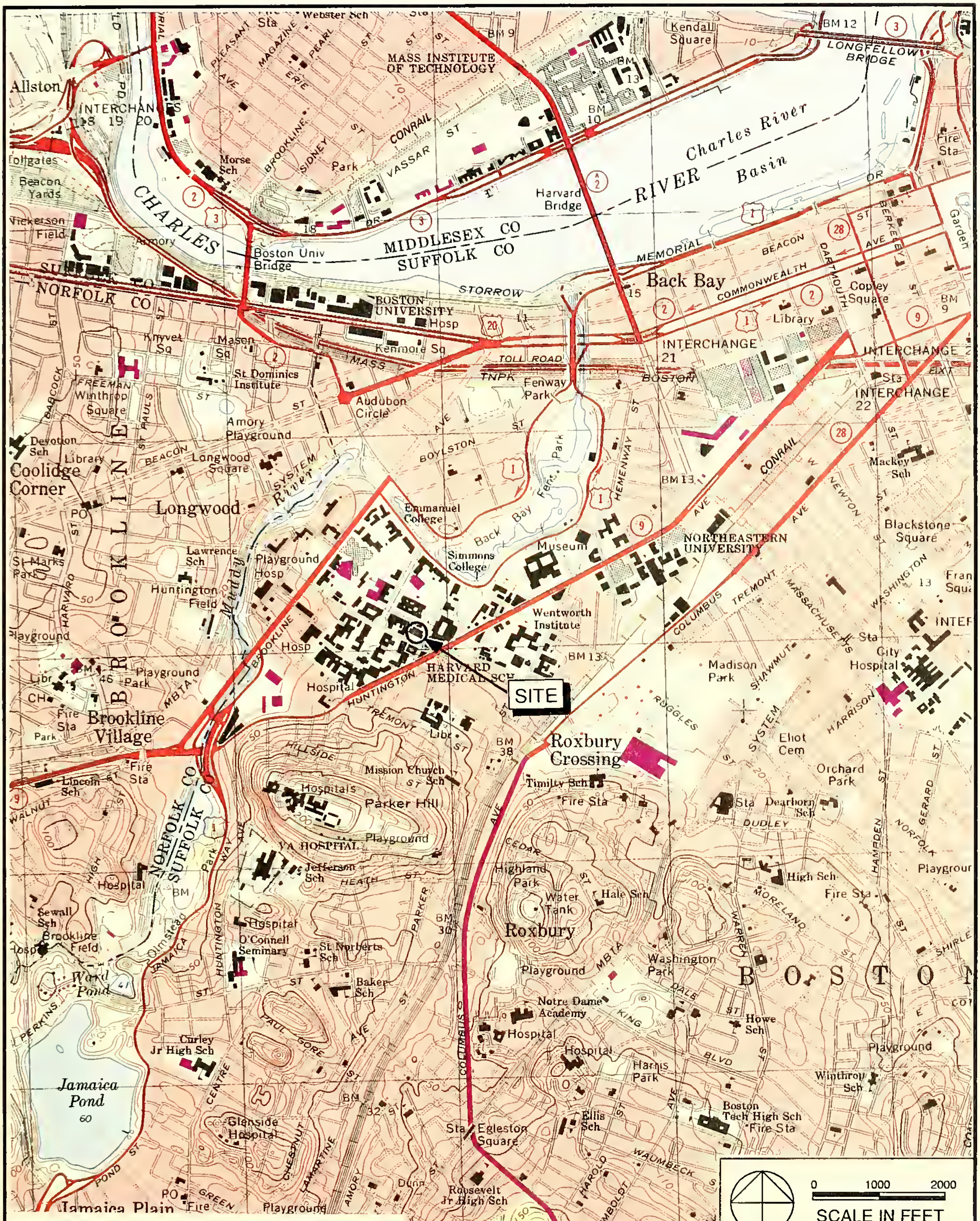
The College is committed to continuing and reinforcing its pre-eminent position in the education and training of pharmacists and other health-care professionals, and in developing new skills to meet the challenges of future developments in medicine and health-care practice.

In order to meet the educational and scholarly needs of its students and faculty, the College recognizes an obligation to provide the resources to encourage learning, research, and scholarship.

The Project described below will provide facilities that will support the academic, student life and student housing, and research needs of the College for at least the next decade. The proposed development is shown in Figure I-2.2.

The New Building

The College proposes the construction of a New Building to the rear of the existing White Building. This location is also adjacent to the LMRC, the Boston Latin School, and Palace Road. The New Building consists of



SOURCE: Boston South, Mass, U.S.G.S. Quadrangle

Figure I-2.1
Site Locus Map
Massachusetts College of Pharmacy & Allied Health Sciences

HMM Associates, Inc.
A Summit Company

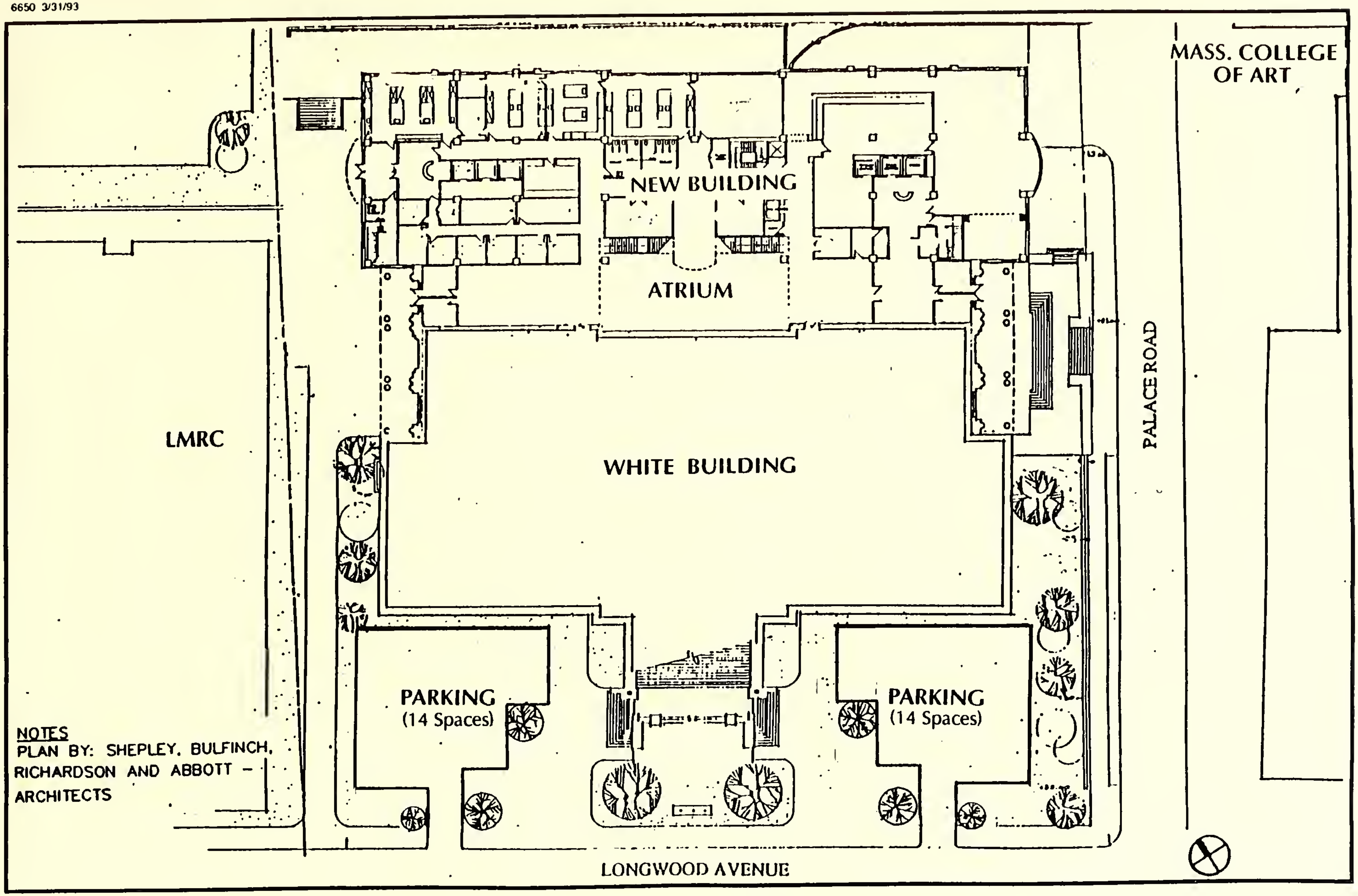


Figure I-2.2
Proposed Site Plan
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

approximately 171,251 gross square feet (GSF/FAR)[1] pursuant to the City's Floor Area Ratio (FAR) definition as set forth in the Boston Zoning Code. The Project is designed to improve and consolidate the College's facilities. The Project received design approval from the BCDC on May 4, 1993 and the BRA on May 27, 1993. As the design is further developed, relatively small changes in floor area will occur. These changes will not increase total Project size such that the FAR of 3.0 is exceeded, nor will they result in other than minor changes in the building envelope.

The New Building will consist of an eight story mixed use structure which will accommodate three programmatic components: academic, student life and student housing, and research space. A new below-grade parking garage for approximately 91 to 96 cars will be located under the New Building. The New Building will also include a service support level below-grade and contain a mechanical penthouse above the highest occupiable floor. The service level will accommodate the loading dock, storage, mechanical equipment, research support laboratories, and other support spaces. The New Building will also include a below-grade connection to BWH's LMRC.

The lower two floors of the New Building will accommodate approximately 43,902 GSF/FAR of space for academic and student life activities such as classrooms, faculty offices, teaching laboratories, research laboratories, cafeteria, and a student lounge (or commons). These floors will be accessed through a skylit atrium and lobby concourse that runs the length of the space between the New Building and the existing White Building. There will be entrances from both the east and west ends of a new lobby which will serve as a connection to College functions in the White Building and the New Building. The atrium will be a significant gathering space for students at the College and the skylight will provide natural light, which is an important component to reinforcing the character of this common space.

The east end of the upper six floors of the New Building will contain approximately 40,882 GSF/FAR of College housing for 175 to 180 students. In addition to the typical double bedrooms, housing floors will have resident assistant's space, and common areas available to student residents including a lounge, study space, kitchen, and central toilets and showers. The housing floors will be entered from its own separate and controlled lobby entrance and elevators, with total separation from all other uses on all floors.

The west end of the upper six floors of the New Building will provide approximately 68,111 GSF/FAR of laboratory and research space that will be

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1 Approximately 233,850 gross square feet (gsf) for MEPA purposes.

leased initially to BWH (the "Research Facility"). The Research Facility will be entered from its own separate and controlled lobby and elevators. There will also be a connection at the service level to the adjacent LMRC. The service level of approximately 18,356 GSF/FAR will contain mechanical equipment, storage and loading facilities as well as laboratories which support the main Research Facility.

All construction and completion dates are approximate and may be affected by delays due to permitting, financing, weather, and other matters beyond the control of the College. Construction of the New Building will commence in July 1993 and be completed by August 1995. The construction program will require the demolition of the existing Newton Building and the existing Garage/Office Building, shown on Figure II-4.1. The Newton Building is presently located on the north side of the Site adjacent to the Boston Latin School. This existing approximate 25,000 gsf building is currently occupied by laboratory, classroom, and office space. The Garage/Office Building abuts the LMRC on the western edge of the Site. This existing, approximately 1,200 gsf building, is currently used by the College for storage and office space purposes.

Channing Laboratory: Research Program

It is anticipated that the Research Facility described above will be occupied by the Channing Laboratory, which will relocate from space at 164 and 180 Longwood Avenue across from the Site. Research conducted by the 200 MDs, Ph.Ds, students, and support staff of the Channing Laboratory is divided between studies primarily using computers and studies using conventional, modern chemical and biological laboratory techniques.

Computer-based research involves sending health-related questionnaires to thousands of people who fall into a particular category, then taking the responses and entering the information into computers. People being studied by Channing are followed for 5 to 15 years. Periodically, computer data is analyzed to assess risk factors for various diseases and the actual occurrence of disease.

The laboratory-based research focuses heavily on designing a new class of vaccines which may be more useful in preventing serious illnesses.

Both the computer-based and laboratory-based research is funded almost exclusively by grants and contracts with the National Institute of Health.

The White Building

The College intends to undertake the phased renovation of the existing White Building. The White Building was constructed in 1917 and has served as the College's primary facility since that time. The proposed renovations include: a) the construction of new rooftop additions to the rear corners of the White Building at the second and third levels; b) construction of a basement level addition in currently unexcavated space which will provide new classroom space; and c) general renovations to the White Building, which in the aggregate will result in approximately 7,824 GSF/FAR of new occupiable space. The proposed renovations to the White Building will result in improved recreation, administrative, library, and classroom space for the College. Renovations of the White Building are also needed to insure compliance with the requirements of the State Building Code and Handicapped Access Regulations. The schedule of renovations to the White Building will extend beyond the completion of the New Building and will be phased, based on funding availability and academic schedule constraints.

2.2.3 Parking

There will be a decrease in the overall number of parking spaces at the Site, which is currently 150 spaces. Total parking following Project completion will not exceed 124 spaces. A one-level parking garage accessed only from Palace Road will be constructed below-grade, beneath the New Building. The garage will provide 91 to 96 parking spaces that will replace 100 at-grade parking spaces currently located behind and to the west side of the White Building. The 50 existing, at-grade parking spaces, currently located in front of the College, will be reduced to 28 spaces to provide for improved site amenities in accordance with the approval of the BCDC on May 4, 1993 and the BRA on May 27, 1993. Additional landscaping will be installed and a reconfiguration of the parking lots completed to provide a more pleasing and inviting open-space along Longwood Avenue.

After a lengthy study by the College of its parking requirements, this split parking scheme (91 to 96 garage spaces and 28 surface spaces) was determined to be the only practical and feasible option available to the College. In addition, the College will cooperate with MASCO's efforts to identify additional parking outside of the LMA.

The College has incorporated a covered loading dock within the garage to insure that tthese services are not visible from Palace Road, and do not interfere with pedestrian movement along the Palace Road sidewalk. To create

this internal service area, the College has voluntarily reduced the number of parking spaces within the garage

2.3 Existing Zoning

According to the current zoning controls, the Site is located within the Apartment FAR 3 (H-3) Zoning District. Under current zoning, the Project would require the issuance of conditional uses permits to authorize the intended uses of the Project, as well as variances from the parapet, rear and side yard setback requirements which are applicable within the H-3 Zoning District. See Table I-2.1 for a further description of the zoning controls which apply within the H-3 Zoning District.

2.4 Project Alternatives

The BRA, in its PAD for the Project, supported the College's evaluation of alternatives and its conclusions, confirming selection of the ENF project (Alternative B) as the College's preferred project.

The original conceptual design (Alternative A) was submitted to the BRA in the PNF dated January 13, 1993 (see Figures I-2.3 to I-2.5). The ENF submitted on February 1, 1993 presented a revised conceptual design and project alternative (Alternative B) which responded to the urban design concerns of the BRA staff (see Figures I-2.6 to I-2.9).

In the Certificate on the ENF dated March 11, 1993, the Secretary requested that the College consider alternatives to the Project which would minimize the Project's effect on the Boston Latin School. It was suggested that these alternatives should consist either of a "smaller build" or a "different massing configuration," which would lessen the need for zoning variances and/or changes in zoning. The Certificate requested that the College provide a comparison of the zoning compliance of the Project and the alternatives selected for consideration, identifying those aspects of the Project and the alternatives selected which do not comply with the current zoning requirements.

The College in the DPIR/DEIR evaluated its proposed Project in light of the zoning constraints which apply within the "Apartment FAR 3" (H-3) Zoning District (the zoning which is currently in effect), and developed and analyzed certain alternatives in accordance with the requirements of the Certificate. The DPIR/DEIR alternatives analysis included: a) a summary of the current re-zoning efforts within the LMA; b) a summary of the existing zoning controls which apply to the Site which is located within the H-3 Zoning District; c) an analysis of the Project and the alternatives in accordance with applicable

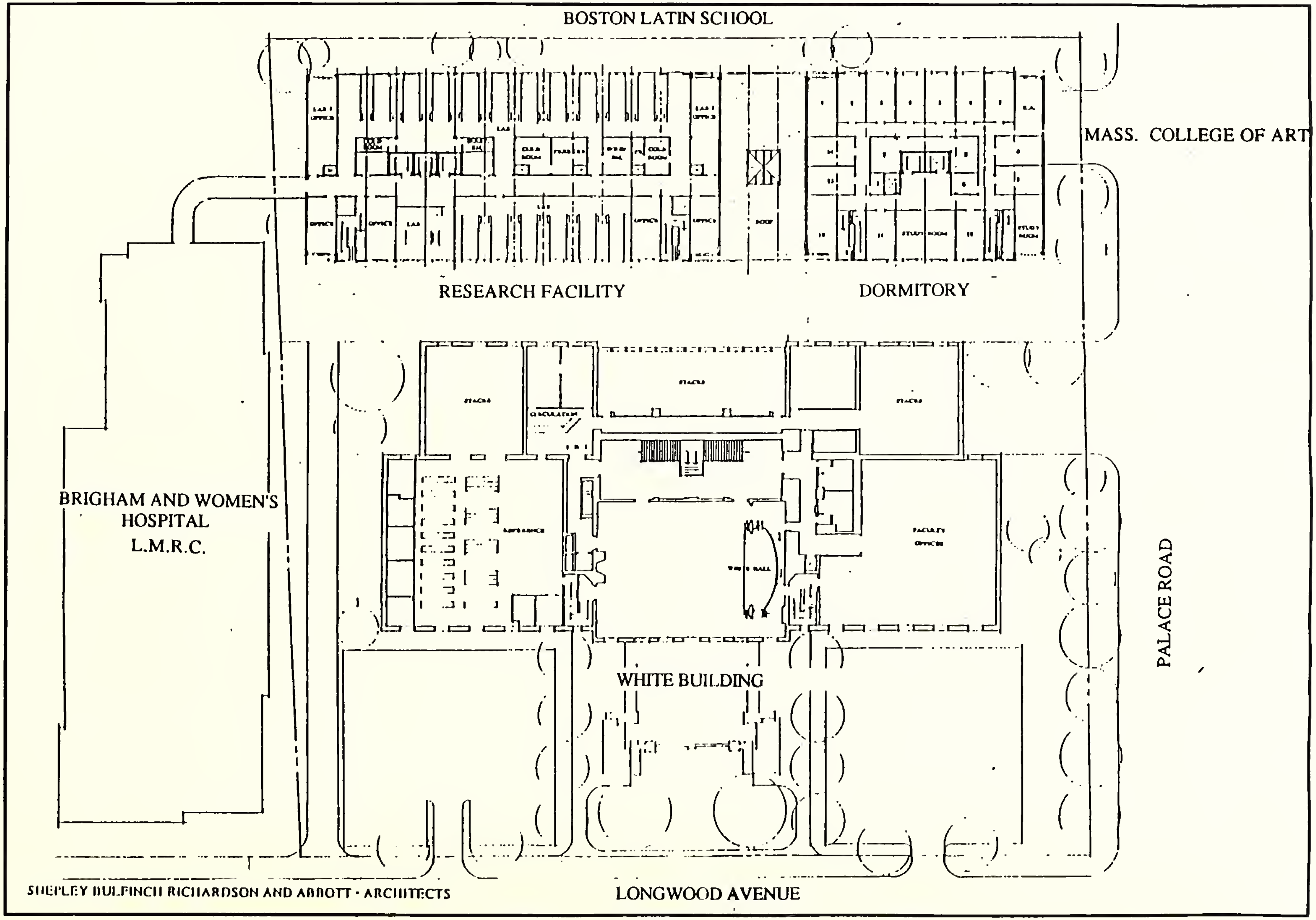

Figure I-2.3
Alternative A (PNF Alternative)
Massachusetts College of Pharmacy and Allied Health Sciences

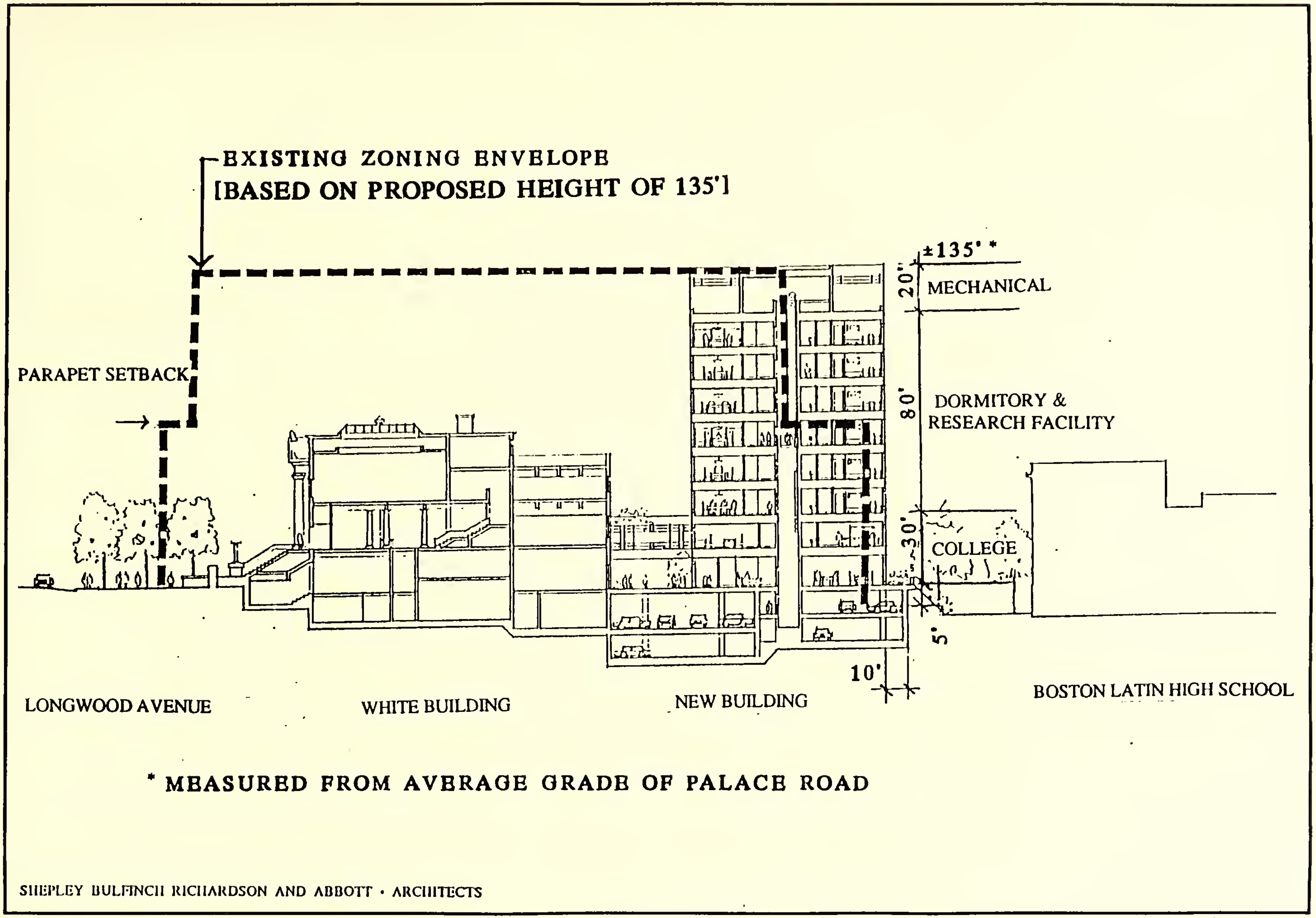

Figure I-2.4
Alternative A (PNF) Zoning Setback Section
Massachusetts College of Pharmacy and Allied Health Sciences

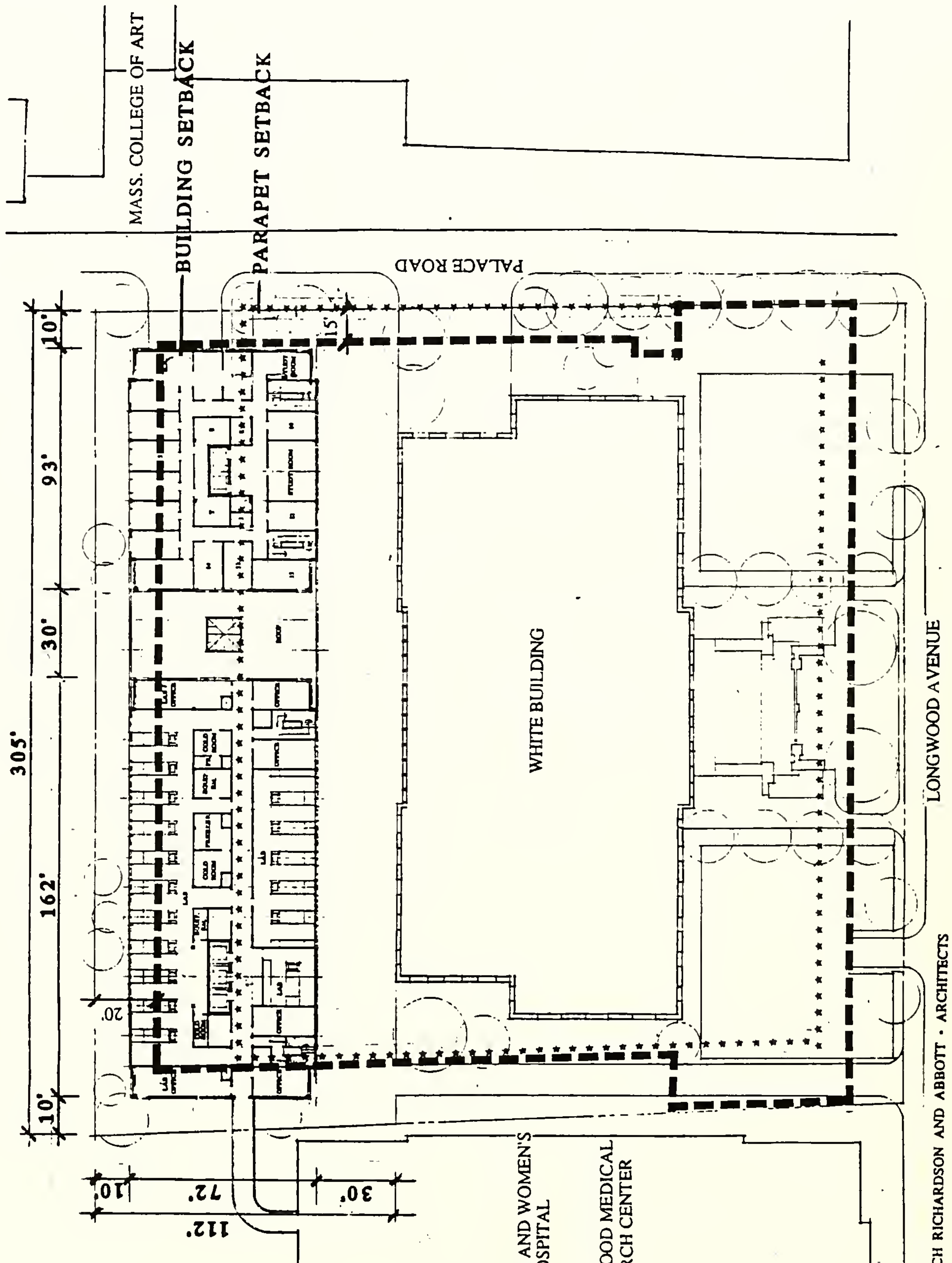

Figure I-2.5
Alternative A (PNF) Zoning Setback Plan

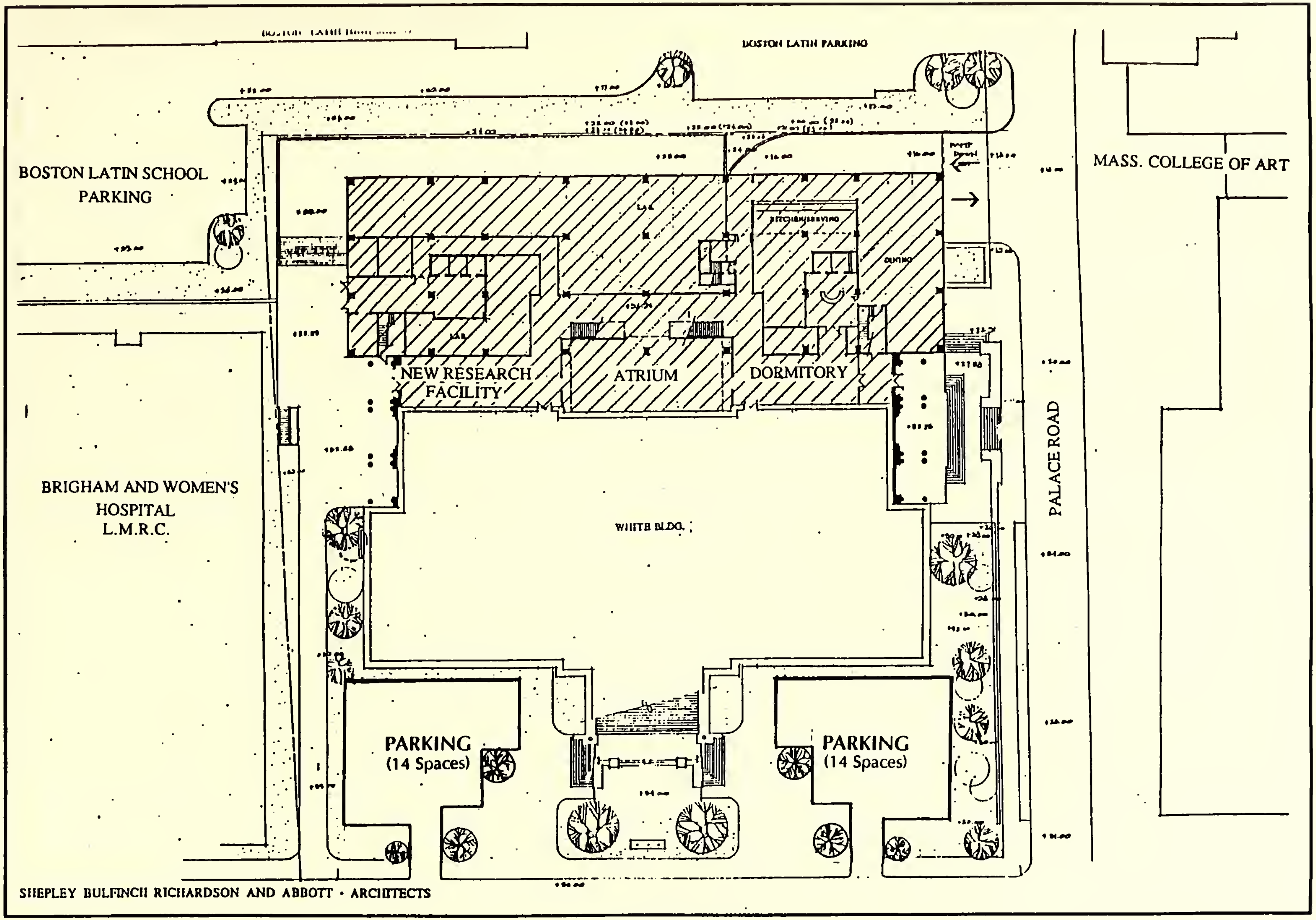

Figure I-2.6
Alternative B (ENF Alternative)
Massachusetts College of Pharmacy and Allied Health Sciences

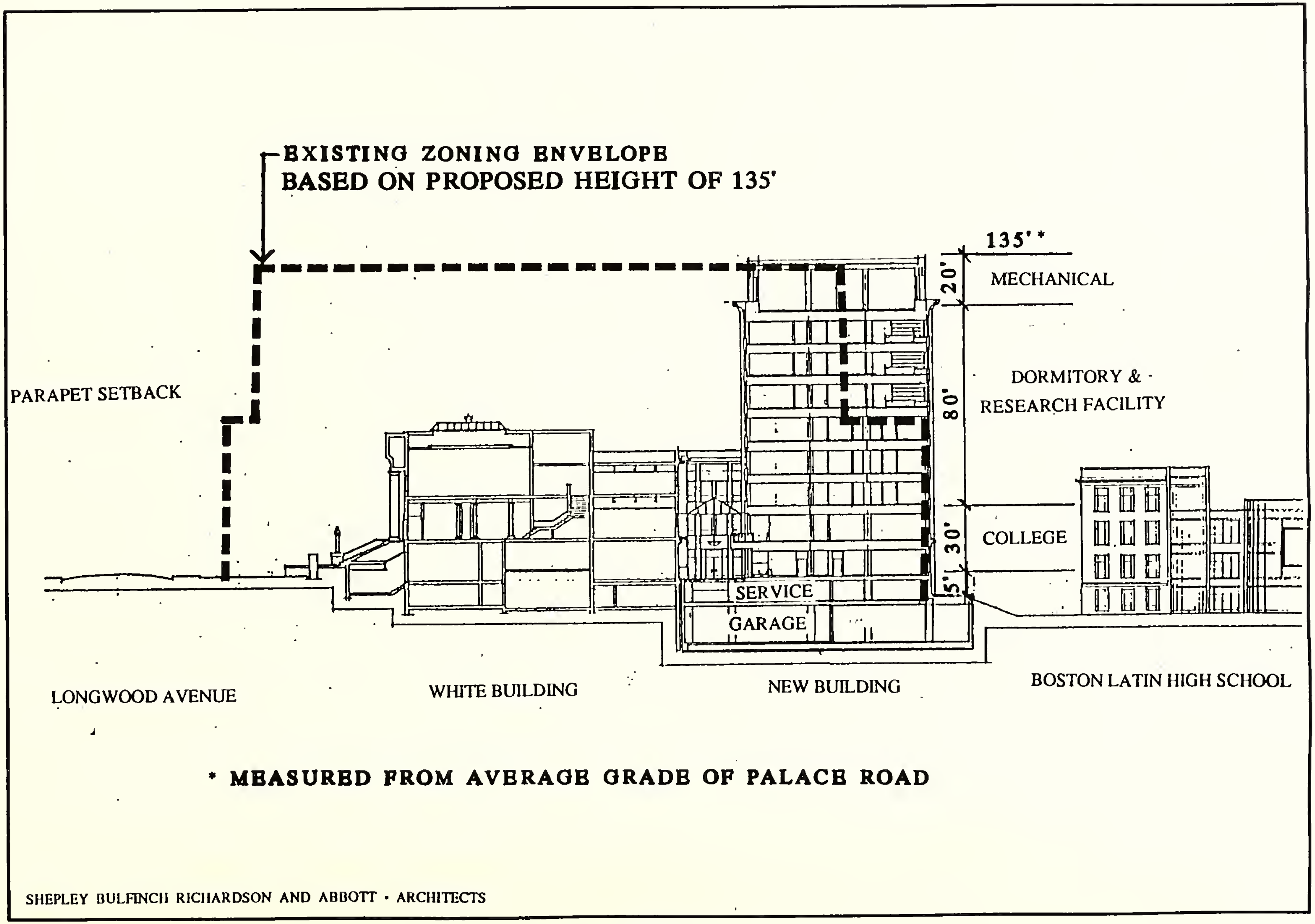

Figure I-2.7
Alternative B (ENF) Zoning Setback Section
Massachusetts College of Pharmacy and Allied Health Sciences

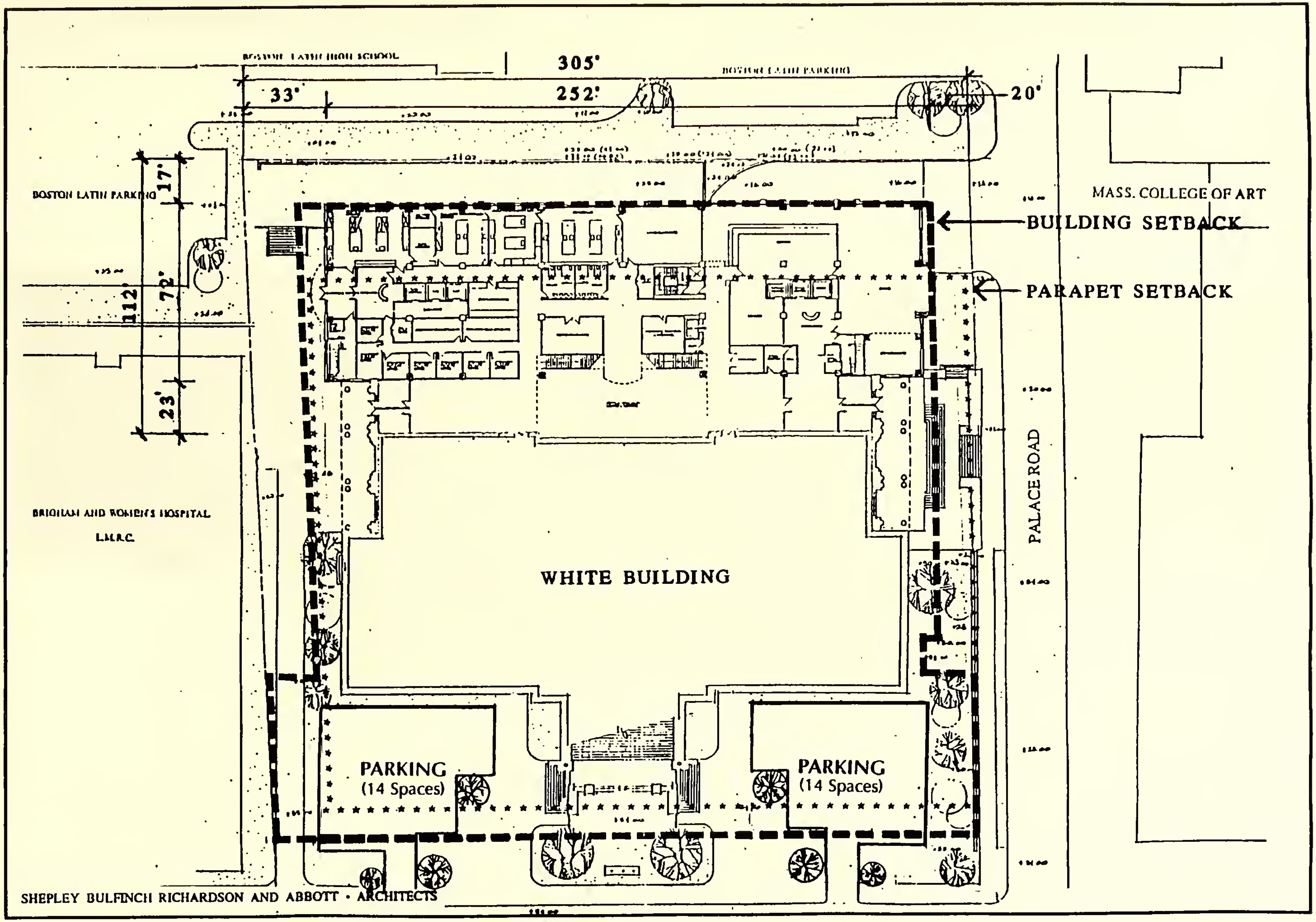

Figure I-2.8
Alternative B (ENF) Zoning Setback Plan
Massachusetts College of Pharmacy and Allied Health Sciences

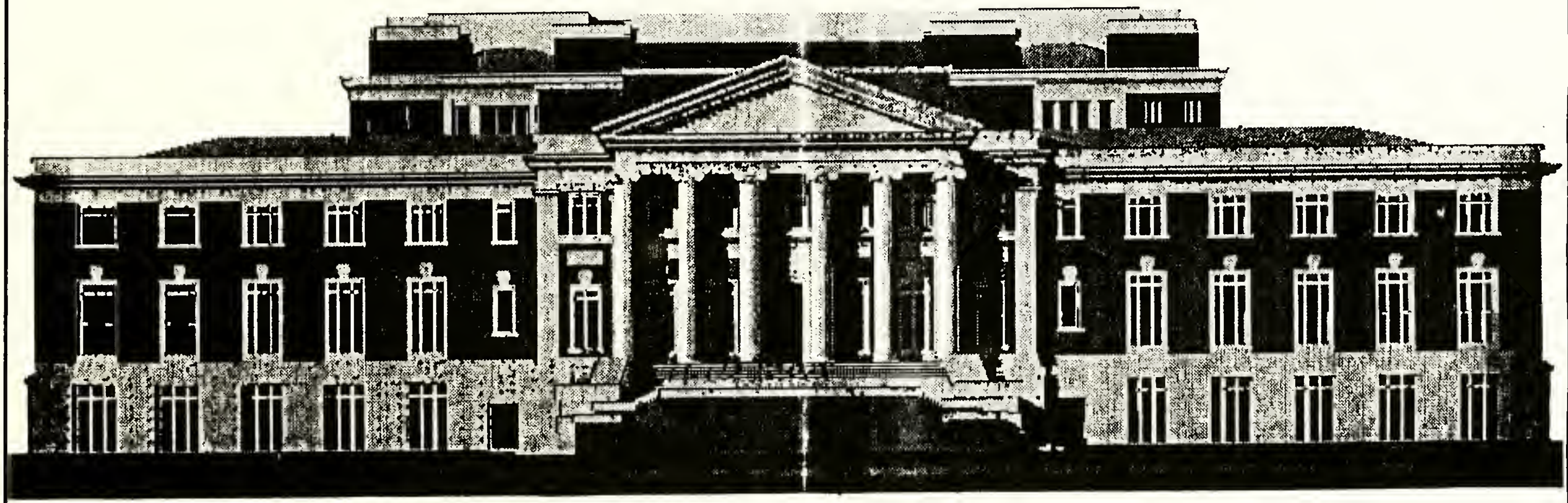

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Figure I-2.9
View of Alternative B From Longwood Avenue

current zoning requirements and a summary of the relevant effects of the Project and the alternatives on the environment; and d) a summary of the zoning controls which the College anticipates will apply to the Project. A summary of this analysis is contained in the following paragraphs. The DPIR/DEIR contains a full discussion and analysis of the alternative design concepts for the Project.

In response to the Secretary's Certificate on the ENF, the College and its consultants also re-evaluated the preferred Alternative B in light of compliance with existing zoning and environmental effects on the Boston Latin School. The additional alternative (Alternative C), that resulted from this re-evaluation was discussed in detail in the DPIR/DEIR (see Figures I-2.10 to I-2.12).

Alternative C was setback further from the Latin School property line, and had an additional story, which was necessary in order to maintain the College's programmatic and space objectives. Although Alternative C was setback further from the Boston Latin School, when viewed as a whole, the overall environmental benefits were minimal. Furthermore, when viewed in terms of the City's urban design objectives for Longwood Avenue, Alternative C presented a more visible mass and was not as fully contextual with the White Building. (The perspective of Alternative C from Longwood Avenue has been further detailed in accordance with the Secretary's Certificate.)

This analysis of alternatives undertaken by the College and its consultants, which included an analysis of zoning compliance and environmental effects of these alternatives (A and C) as compared to the Alternative B (the preferred Project), indicated that Alternative B was the appropriate design for the Project. It meets the College's program and space objectives while minimizing overall environmental effects, and when seen as a whole, is an improvement over the development permitted as-of-right in accordance with existing zoning, Alternatives A and C, or the zoning envelope. Table I-2.1 provides a summary which compares the alternatives to existing zoning requirements as requested by the BRA's PAD. Please see DPIR/DEIR for a full discussion of alternatives considered for the Project.

2.5 Project Cost and Timetable

Total construction cost (excluding renovations to the White Building) is estimated at approximately $39,000,000.

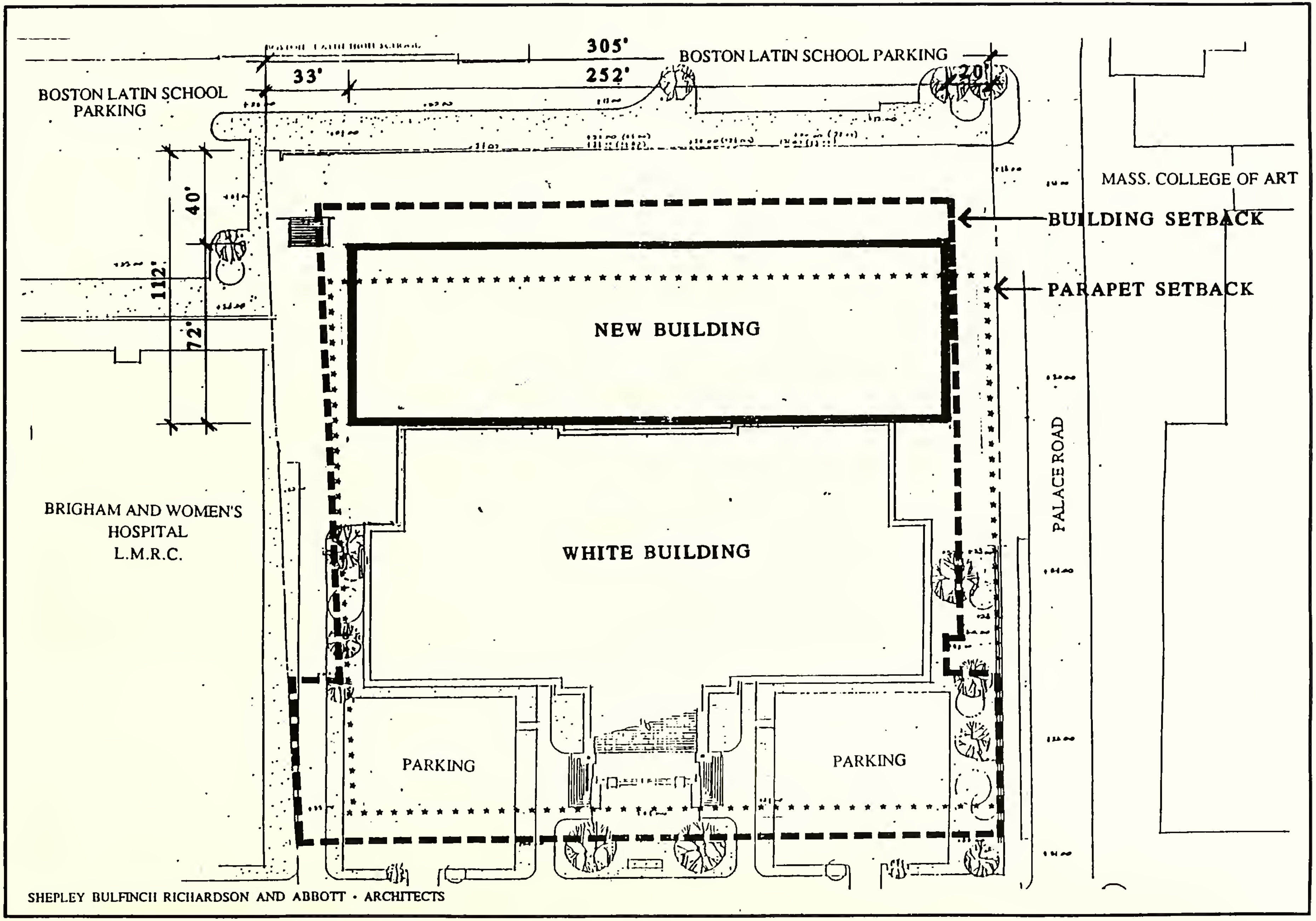

Figure I-2.10
Alternative C Zoning Setback Plan

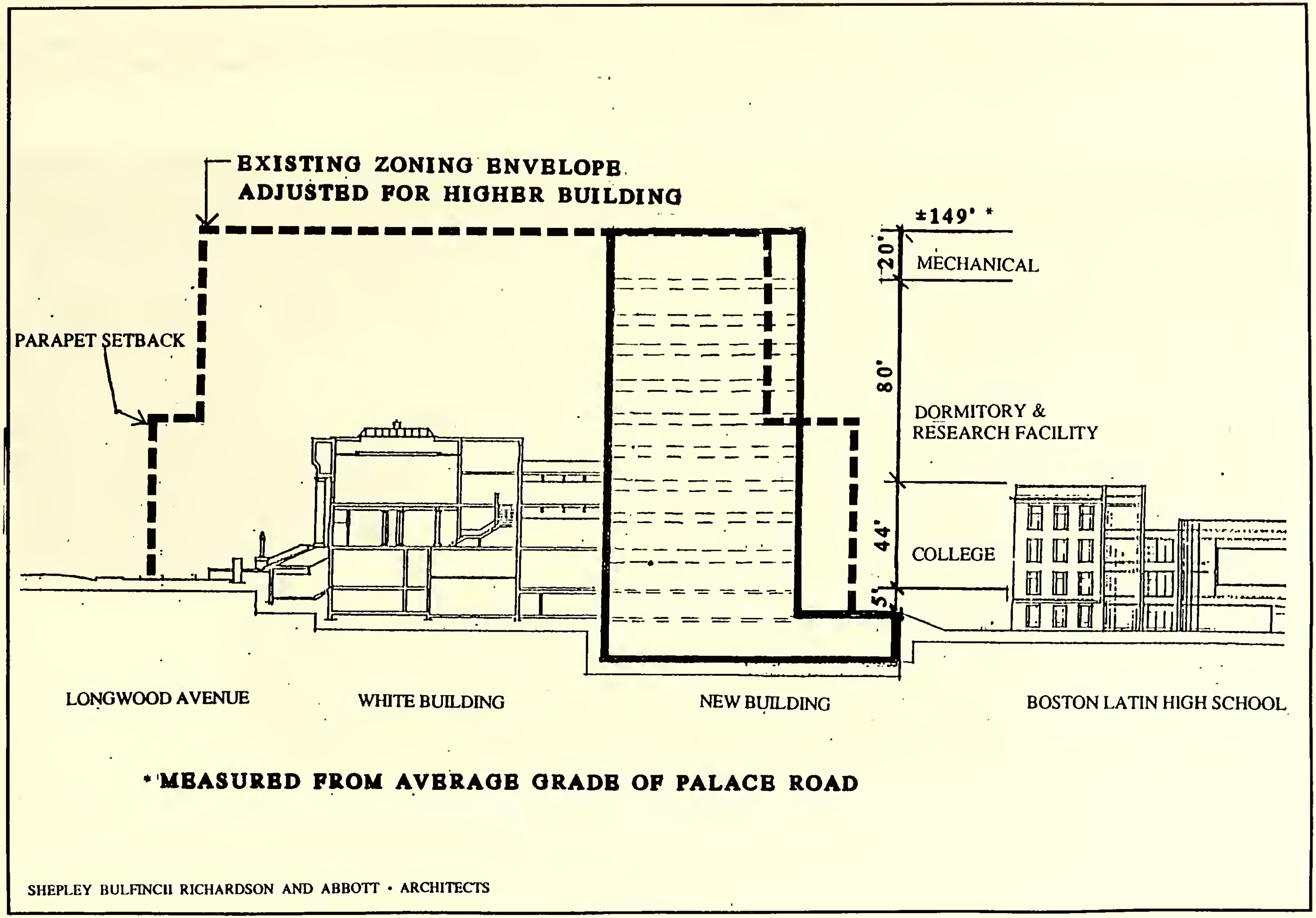

Figure I-2.11
Alternative C Zoning Setback Section
Massachusetts College of Pharmacy and Allied Health Sciences

NOTES: Shepley Bulfinch, Richardson and Abbott - Architects

Figure I-2.12
View of Alternative C From Lonfwood Avenue
Massachusetts College of Pharmacy and Allied Health Sciences

Table I-2.1: Summary of Alternatives Analysis and Comparisons to Existing Zoning Requirements

Element	Existing Zoning	Alternative A	Alternative B	Alternative C
Lot Size	No requirement	N.A.	N.A.	N.A.
Lot Area	No requirement	N.A.	N.A.	N.A.
Lot Width	No requirement	N.A.	N.A.	N.A.
Height	No limit	135 ft.	135 ft.	149 ft.
Usable Open Space	No requirement	N.A.	N.A.	N.A.
FAR	3.0 max.	3.0 max.	3.0 max.	3.0 max.
Front Yard	15 ft.	70 ft. ±[1]	70 ft. ±[1]	70 ft. ±[1]
LMRC Side Yard	10 + L/20[1]	0 ft.[1]	0 ft.[1]	0 ft.[1]
Palace Rd. Side Yard	15 ft.[2]	10 ft.	19 ft.	20 ft.
Boston Latin Rear Yard	20 ft.[3]	10 ft.	17 ft.	40 ft.
Boston Latin Rear Parapet Setback				
Required	$\frac{H+L}{6}$	52'-10"	52'10"	55'-2"
Provided	N.A.	10 ft.	17 ft.	40 ft.
LMRC Side Parapet Setback				
Required	$\frac{H+L}{6}$	22'-10"	22'10"	25'-2"
Provided	N.A.	10 ft.	28 ft.	26 ft.
Palace Rd. Side Parapet Setback				
Required	$\frac{H+L}{6} - 25\,ft$ [4]	2'-10"	2'10"	5'-2"
Provided	N.A.	10 ft.	19 ft.	20 ft.

1 Where L = Length of wall parallel to lot line, measured parallel to lot line, measured at first floor. See also Article 19-4 of the Boston Zoning Code.

2 See also Article 19-6 of the Boston Zoning Code.

3 See also Article 20-4 of the Boston Zoning Code.

4 See also Article 21-1 of the Boston Zoning Code.

N.A. = Not Applicable

Construction is expected to last approximately two years. Demolition is expected to begin in July 1993, and construction of the New Building is expected to be completed by August 1995. Typical construction hours for the Project will be from 7:00 AM to 3:30 PM, Monday through Friday, although steel erection, foundation preparation, concrete pouring, and masonry work may extend to 5:30 PM on weekdays.

3.0 SUMMARY OF ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

The following sections summarize the anticipated environmental effects from the Project and proposed mitigation measures to anticipated environmental effects.

3.1 Transportation

The transportation effects of the Project are modest. The Project is, for the most part, a consolidation and relocation of existing uses on the Campus resulting in a minimal increase in overall peak hour trips on the roadway network. In an effort to further reduce an increase in trips, as well as to reduce current demand, the College will implement a Transportation Demand Management Program.

The College will cooperate with MASCO in its ongoing efforts to improve signal timing and traffic operations along Longwood Avenue and in the LMA. Such improvements could lead to improved LOS conditions at the two signalized intersections - Huntington Avenue/Longwood Avenue and Brookline Avenue/Longwood Avenue.

The College will implement a Commuter Mobility Plan designed to reduce single occupant vehicle use by faculty, staff and students. The Plan will include measures designed to increase the cost of parking, vanpool ridership and adopt policies and management incentives discussed in the Transportation Analysis Section. The College will also cooperate with MASCO's efforts to identify additional parking outside of the LMA.

3.2 Wind

The Project is not expected to have environmental effects on pedestrian level winds away from the Site, but will increase winds slightly in two areas near the Site. The two areas are: 1) Palace Road near the New Building's east corner for northeast winds, and 2) at the northwest end of the New Building near its north corner for both northwest and northeast winds. Based on an erosion wind tunnel testing study, winds in the area around the Project's north corner may be close to the low end of Melbourne's Comfort Category (uncomfortable for walking). This area, however, is expected to see little, or no, pedestrian activity as it is not within a corridor linking site entrances and on-site parking areas or major off-site pedestrian ways. The wind conditions at the east corner of the Project are predicted to be in the upper end of Melbourne's Comfort Category 3 (acceptable for walking).

The Project will include additional landscaping on the northeast side of the Site along the Boston Latin School. The landscaping will mitigate pedestrian level winds at the New Building's corners from the northwest and northeast wind conditions. Additional landscaping along the walkway between Longwood Avenue and the Research Facility portion of the New Building will further mitigate the effects of northwest winds, while landscaping near the east corner of the New Building at Palace Road will provide a wind break. The setback of the New Building entrance to the Research Facility will also buffer this area from these winds.

3.3 Shadow

New shadows from the Project will be limited primarily to the walkway along the Boston Latin School to the north of the Site. Some additional shading occurs on the south facade of the Boston Latin School containing classrooms and the gymnasium. In the morning hours for all time periods except in December, new shadows do not reach the south facade; at 3:00 PM during all time periods, shadows fall primarily on the gymnasium portion. New shading of sidewalks and along roadways at and around the Project is largely avoided. Please see DPIR/DEIR for a discussion of the differences in shading for each of the alternatives evaluated.

3.4 Daylight

Daylight obstruction is unchanged from the existing condition from the Longwood Avenue viewpoint, remaining at the existing obstruction of 20% following construction of the New Building. There is a modest increase in daylight obstruction from the Palace Road viewpoint when compared to obstruction under existing conditions due to the Newton Building. Daylight obstruction at this viewpoint is 39% following construction of the New Building.

Daylight obstruction is increased from the viewpoint of the Boston Latin School walkway to the north of the Site. This is due in part to the reconfiguration of the New Building undertaken in order to minimize shadow effects on the Boston Latin School. Given the massing required for the programmatic objectives of the College, daylight obstruction at this viewpoint was unavoidable.

In response to the BRA's PAD request, further setback of the rooftop mechanicals is not possible. Even if this was feasible, minimal daylight obstruction improvements would occur.

The proposed design limits daylight obstruction to the greatest extent possible given the location of the Project, and the College's programmatic and space requirements.

3.5 Air Quality

An air quality analysis was conducted to evaluate motor vehicle emissions due to an increase in traffic generated by the Project once it is fully occupied. The analysis involved a microscale study designed to determine carbon monoxide ambient air concentrations at sensitive receptor locations around the Site (including the Boston Latin School and Palace Road) and signalized intersections experiencing the greatest congestion (i.e. Huntington Avenue/ Longwood Avenue and Brookline Avenue/Longwood Avenue). This study was prepared according to a model protocol developed in consultation with the BRA and Massachusetts Department of Environmental Protection (DEP). The results of the study (as revised based on DEP comments on the DPIR/DEIR) demonstrate that air quality standards for carbon monoxide (CO) will be maintained after the Project has been completed.

The design of the ventilation systems for the New Building will include methods to recover or decompose constituents prior to exhausting. In addition, enhanced dilution is expected for the trace quantities vented, as the exhaust will occur from above the New Building's roof level.

The boiler plant required for the New Building will include Best Available Control Technology (BACT) for all.emissions, as defined by the Massachusetts DEP. The use of natural gas to fire the plant will virtually eliminate emissions of sulfur dioxide and minimize particulate emissions to very low levels. Additional mitigation from that set forth in the DPIR/DEIR currently being considered. This mitigation would reduce flame temperature thus minimizing NO_X emissions.

3.6 Water Quality

The Site is outside the 100-year floodplain of the Muddy River and the 100-foot buffer zone associated with wetland resources. The Site is currently fully built up or paved with existing buildings and parking areas. The Project will lead to improved quality of the runoff at the Site through installation of new collection roof drains, and sediment and oil grease traps in the parking garage and delivery area drains. These traps will be periodically cleaned to maintain capture ability. In addition, litter sweeps will be made as needed on pedestrian walkways to control the amount of debris that is entrained in stormwater runoff.

3.7 Noise

An evaluation of the operational noise effects was conducted for the Project. The results of the noise evaluation indicate that operation of the Project will comply with the noise requirements of the City of Boston Noise Ordinance and DEP Noise Policy at all receiving properties.

The existing noise levels in the area were established by measurements. Future noise levels from Project related sources were estimated at the Site and at nearby receiving properties. Although the Project is in the design stage, the major noise producing items were identified. Equipment noise levels were estimated based on vendor data and on measurements at the louver face of a similar mechanical room penthouse. Noise modeling was conducted to estimate the facility noise levels at nearby institutional and residential land uses.

City and State noise requirements will be achieved through significant attention to noise control in both the initial and later stages of design. The noise producing equipment required for the New Building will be placed on the roof in the mechanical penthouse, taking maximum advantage of distance and directivity to nearby properties. In addition, the roof line will be constructed in a way to create a natural barrier to noise from the rooftop cooling towers.

As the design is finalized, additional noise mitigation features will be selected to meet the requirements of the Boston Noise Ordinance at the property line nearest the penthouse louvered openings.

3.8 Geotechnical

A geotechnical engineering survey conducted at the Site indicates that the subsurface consists of fill overlying very dense marine sand and clay. The dense or stiff marine sand and clay present at the Site will reduce the potential for settlement of adjacent buildings.

Underpinning of LMRC is required during construction to mitigate geotechnical impacts. This same procedure is not required at the Boston Latin School because of its distance from the proposed construction.

During the excavation phase of construction, dewatering will be required. Existing pervious marine sands will remain below and surrounding the New Building. Therefore, any existing groundwater flow patterns will not be significantly affected by the below-grade portions of the New Building. The New Building will be designed to resist hydrostatic pressure. In addition, the New Building will not include underdrains which permanently lower the groundwater table.

3.9 Solid and Hazardous Wastes

Based on oil and hazardous material site evaluations performed for the College by Haley & Aldrich, Inc., there is no evidence that the Site was used as a disposal site, or that there has been any on-site hazardous material releases.

Demolition debris from the Newton Building and the Garage/Office Building will be properly disposed of by a licensed contractor. Construction debris such as wood, metal, and non-contaminated steel will be recycled when possible. Prior to any demolition or construction activities, asbestos within the Newton Building and the White Building will be removed by a licensed contractor.

The College and the Research Facility will use its existing waste management recycling plans to dispose of operational waste generated by the Project. Chemical waste generated by the College and Research Facility will be stored in properly vented and insulated cabinets and picked up by a licensed contractor. The College currently recycles white paper and cardboard. Expansion of the recycling program is being considered to include additional materials associated with the cafeteria and laboratory space.

3.10 Construction

The construction period for the Project is expected to last approximately two years. Typical construction hours for the Project will be from 7:00 AM to 3:30 PM, Monday through Friday, although steel erection, foundation preparation, concrete pouring, and masonry work may extend to 5:30 PM on weekdays.

An evaluation of the construction noise effect was conducted for the Project. The existing daytime L_{10} levels in the area were established by measurements. Future noise levels from project construction sources were estimated at the source and at a distance of 50 feet. Construction equipment noise levels were adjusted based on frequency of use and the character of the sounds produced. A combined level from all construction sources was estimated for each phase of construction. The results of the construction noise evaluation indicate that during construction, the noise requirements of the City of Boston Construction Noise Limits will be achieved.

A Construction Management Plan (CMP) will be submitted to the Boston Transportation Department for approval prior to the start of construction. The CMP will include specific mitigation measures and staging plans to minimize effects on abutters, particularly the Boston Latin School and its operation; pedestrians using Palace Road and the walkway located to the rear of the New Building; and automobile traffic around the Site.

3.11 Urban Design

The New Building, the White Building, and the connecting element between the two buildings will present a new, unified composition on the Site that is compatible with its urban context. The New Building, located behind the White Building and setback from Longwood Avenue, will be unobtrusive from Longwood Avenue. The setback from the Boston Latin School property line has increased from 10 feet, as originally proposed in the PNF alternative, to approximately 17 feet, thereby improving on massing and providing a greater separation from the Boston Latin School. The setback of the New Building from Palace Road has also increased from 10 feet to 15 feet from the original alternative.

The design of the New Building addresses BRA issues contained in its Scoping Determination of February 16, 1993 and its Preliminary Adequacy Determination of May 21, 1993, including: 1) new major landscaping and parking improvements made to the Longwood area frontage; 2) the provision of a cornice line which minimizes apparent height and better integrates the architecture of the New Building with the White Building; and 3) selection of building materials (brick and precast concrete) which will reinforce the masonry character of the district and is carefully coordinated with the brick and limestone of the White Building.

The Project has been designed to minimize effects on abutters. The increased setback at the northern property line of the Site allows a softer treatment of the space between the New Building and the Boston Latin School, with landscaped plantings rather than a hard surface. Pursuant to requirements of the Project's approval by the BCDC on May 4, 1993 and the BRA on May 27, 1993, additional landscaping will be provided along Longwood Avenue in front of the White Building and there will be a reduction in automobile capacity in the two existing parking areas.

As the proposed Project is consistent with the height scale, massing, and uses of buildings within the general vicinity of the Project, no further mitigation is required.

3.12 Historic Resources

The Project is consistent with existing historical and cultural resources in the vicinity of the Site. A review of Masschusetts Historical Commission files disclosed no known archaeological sites within a one-half mile radius of the College. The Isabella Stewart Gardner Museum is the only building listed in the National Register of Historic Places within the Project vicinity. The Project will increase shading on a limited portion of one facade of the Museum

One alternative massing (Alternative C) actually increased shading on the Museum. Given the space required for the programmatic objectives of the Project and its urban location, some shading effects cannot be avoided.

The proposed uses of the Site are in context with the noted cultural and historical nature of the Project vicinity. Design elements of the New Building are also in context with other buildings in the vicinity. As there will not be effects on these historic resources identified in the Report, no further mitigation is proposed.

3.13 Infrastructure

The Project will generate an average sewage discharge of 42,600 gallons per day (gpd) of sanitary wastewater, which is a net slight increase from the DPIR/DEIR due to an increase in floor area on the service level (which increase is off-set by a slight reduction in floor area in the Research Facility). Wastewater will be discharged to an existing BWSC sewer under Palace Road. Analysis of sewers along the sewer route indicate sufficient available capacity. An additional peak discharge of 27 gallons per minute (gpm) will be generated during periods of cooling tower blowdown. These periods are expected to last for 2 to 3 minutes, approximately once per week.

A sewer discharge permit application will be submitted to DEP and Massachusetts Water Resource Authority prior to the initiation of Project wastewater discharge.

The Project will require approximately 66,860 gpd of water on average when the cooling tower is in operation, and 46,860 gpd of water on average when the tower is not in operation. Available hydrant test data indicates that there is sufficient available capacity in area water mains to meet Project needs. In response to BRA's PAD, no additional hydrant tests were deemed necessary as no evidence of capacity problems was noted in the project area based on recent conversations with representatives of BWSC.

In order to minimize domestic water use and sanitary wastewater discharge, the College will meet all applicable code requirements for the installation of low flow fixtures. In order to minimize process water use, cooling tower use will be restricted to periods when the outside ambient temperature exceeds 55°F. In addition, tower draft fans will not be used during moderate temperature periods to further reduce evaporative losses from the cooling tower operation.

II. GENERAL INFORMATION

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1.0 APPLICANT INFORMATION

1.1 Project Identification

Project Name:	Massachusetts College of Pharmacy and Allied Health Sciences Project
Location:	The Project is located in the Longwood Medical Area at 179 Longwood Avenue in Boston, Massachusetts, and is bounded by Longwood Avenue, Palace Road, Boston Latin School and Brigham and Women's Hospital's Longwood Medical Research Center (the "Site").
Size:	Approximately 90,147 square feet of land (approximately 2.0 acres).
Existing Uses:	Three buildings are currently located on the Site: the George Robert White Building (the "White Building"); built in 1917, the Newton Building, built in 1961, and a small single-story, converted garage building (the "Garage/Office Building") which is currently used for office and storage space. There are also 150 existing parking spaces located in three on-site, surface areas.
Proposal Summary:	The College is proposing to construct approximately 171,251 GSF/FAR, for floor area ratio (FAR) purposes* of new space (the "New Building") behind the existing White Building. The New Building will accommodate three programmatic components: academic, student life and student housing, and research space. A new below-grade, parking garage accommodating approximately 91 to 96 spaces is proposed; a support service level will be located under the New Building; and a mechanical penthouse is proposed above the top occupiable floor. The existing 50 surface spaces located in the front of the White Building will be reduced under the approved Schematic Design Plan to 28 spaces.

* Approximately 233,850 gsf for MEPA purposes.

The construction of the New Building will require the demolition of the existing Newton Building and the Garage/Office Building presently located behind the White Building.

The College also intends to undertake the phased renovation of the existing White Building. These renovations will include the construction of two small additions at the second and third floors; new occupiable space located in the basement and attic, and improved recreation, administration, library, and classroom space. The additions will increase total occupiable space by approximately 7,824 GSF/FAR.

The FAR resulting from the total Project will not exceed the existing allowable zoning of 3.0.

1.2 Development Team

Owner/Developer:

Massachusetts College of Pharmacy
and Allied Health Sciences
179 Longwood Avenue
Boston, MA 02115

Louis P. Jeffrey, Ph.D.
President
(617) 732-2880

Benjamin R. Hershenson, Ph.D.
Vice President for Academic Affairs,
Dean of the College
(617) 732-2842

Abraham Haddad, Ph.D.
Vice President for Administration
(617) 732-2854

Project Manager/
Construction Manager:

William A. Berry & Son, Inc.
100 Conifer Hill Drive
Danvers, MA 01923
(508) 774-1057

John E. Kavanagh III
Gregory Antonopoulos

Architect:	Shepley Bulfinch Richardson and Abbott 40 Broad Street Boston, MA 02109 (617) 423-1700 H. Jan Heespelink, AIA
Legal Counsel:	Pitt, Hubbard & Marshall 201 Devonshire Street Boston, MA 02110 (617) 423-4445 Mary T. Marshall, Esquire Powers & Hall Professional Corp. 100 Franklin Street Boston, MA 02110 (617) 728-9607 Robert W. Holmes, Jr., Esquire Walter Van Dorn, Esquire
Community Relations:	McDermott/O'Neill & Associates 75 State Street Suite 2130 Boston, MA 02109 (617) 261-2200 David A. Passafaro
Environmental and Transportation Consultant:	HMM Associates, Inc. 196 Baker Avenue Concord, MA 01742 (508) 371-4000 Mitchell L. Fischman, AICP Kimberley Adam Barry Porter, AICP

Wind Consultant:	Frank Durgin, P.E. c/o Wright Brothers Wind Tunnel Building 17-110 Massachusetts Institute of Technology Cambridge, MA 02139 (717) 253-2270
Geotechnical:	Haley & Aldrich 58 Charles Street Cambridge, MA 02141 (617) 494-1606 Tom Lieu, P.E. William Weiler, P.E.
Land Surveyor:	Gunther Engineering, Inc. 285 Summer Street Boston, MA 02210 (617) 439-4394 Peter Freulich, P.L.S. James P. Lapsley, P.L.S.
Mechanical and Electrical Engineer:	Bard, Rao & Athanas Consulting Engineers, Inc. 1320 Soldiers Field Road Boston, MA 02135 (617) 254-0016 Gene Bard, P.E. Louis A. Percoco, P.E. Kevin Sheehan, P.E.
Plumbing/Fire Protection Engineer:	Robert W. Sullivan, Inc. Consulting Engineers Unit 302, Union Wharf Boston, MA 02109 (617) 523-8227 Bahig A. Kaldas, P.E.

Structural Engineer:

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Joseph A. Salvia, P.E.
Bob McNamara, P.E.

2.0 LEGAL INFORMATION

2.1 Legal Actions Pending Concerning the Proposed Project

The College is not aware of any legal actions pending concerning the Project.

2.2 Evidence of Site Control Over the Project Area

The Project is proposed to be constructed on a portion of the property owned by the Massachusetts College of Pharmacy and Allied Health Sciences, known and numbered as 179 Longwood Avenue of Boston, Massachusetts. The College is the fee owner of the Site.

3.0 FINANCIAL INFORMATION

The Applicant is seeking financial assistance from the Boston Industrial Development Finance Agency (BIDFA) and the Massachusetts Industrial Development Finance Agency (MIFA) in order to construct this Project. Financial information for the Project is being developed for BIDFA/MIFA. Pursuant to the request in the Preliminary Adequacy Determination, financial information for the Project will be provided to the BRA.

4.0 PROJECT AREA

4.1 Description of Metes and Bounds of Project Area

The Site consists of approximately 90,147 square feet of land (approximately 2.0 acres) located on the northeasterly side of Longwood Avenue in Boston, Suffolk County, Massachusetts, known as and numbered 179 Longwood Avenue. The Site is bounded and described as follows:

- Southwesterly by Longwood Avenue, two hundred ninety-six and 19/100 (296.19) feet
- Southeasterly by Palace Road, three hundred and 06/100 (300.06) feet
- Northeasterly by land of the City of Boston (Boston Latin High School), three hundred four and 79/100 (304.79) feet
- Northwesterly by land of BWH, three hundred and four and 34/100 (304.34) feet

The Site is located and situated in the County of Suffolk, Commonwealth of Massachusetts. For the College's title, see copies of two Deeds recorded with the Suffolk County Registry of Deeds in Book 4003, Page 356, and Book 4015, page 519, respectively, and plan recorded in Record Book 4003, page 356.

The Site is shown on the attached survey plan (Figure II-4.1) prepared by Gunther Engineering, Inc., Land Surveyor.

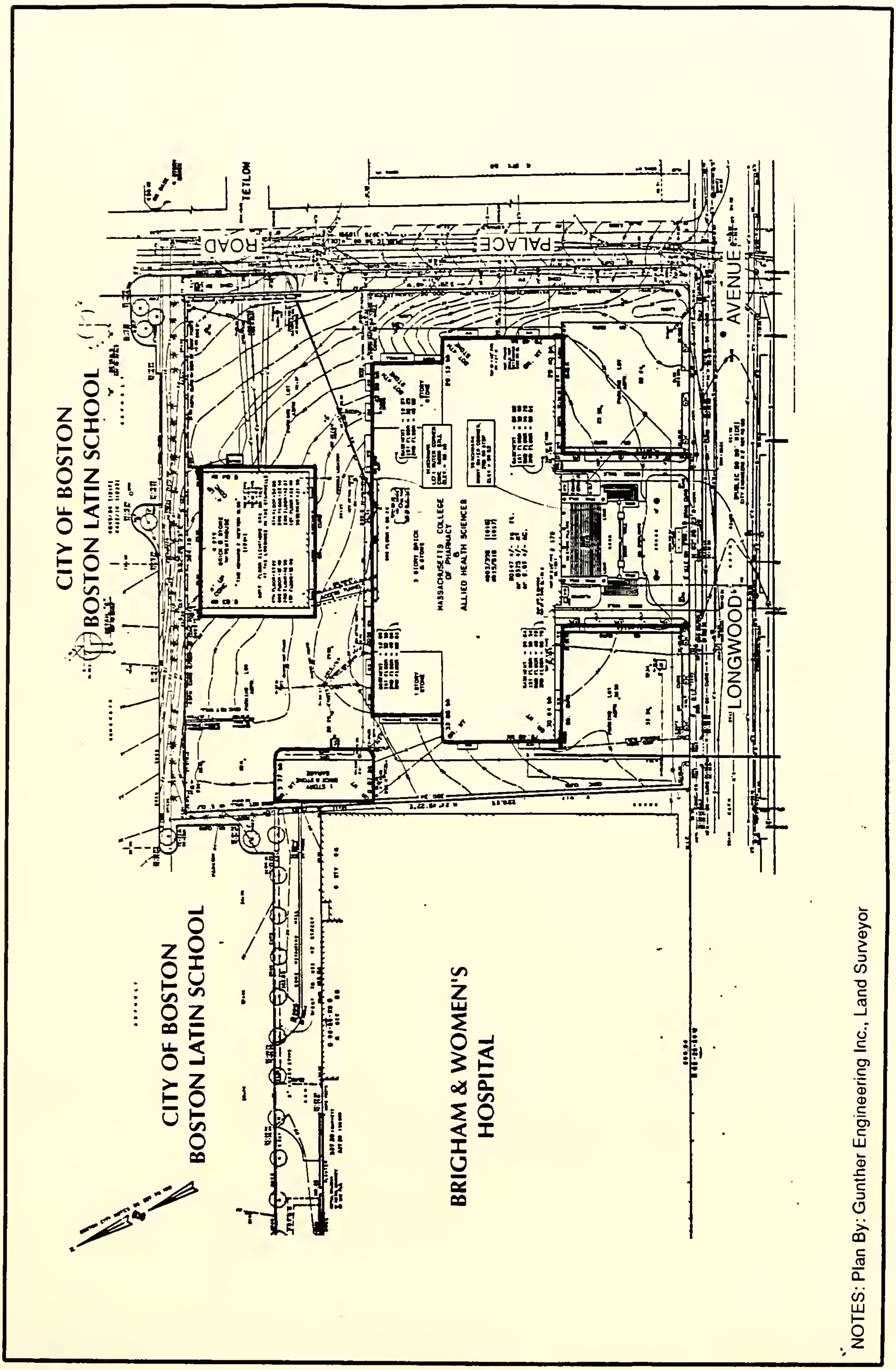

Figure II-4.1
Site Survey Plan
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

5.0 PUBLIC BENEFITS

5.1 Development Impact Project Contribution

The Project constitutes a Development Impact Project ("DIP"), as that term is defined in accordance with Section 26A-26B of the Zoning Code. The College's DIP Plan for the Project was approved by the BRA on May 27, 1993. The College will provide linkage contributions to the City of Boston, in the amount of approximately $229,000. These linkage contributions will aid in the development of affordable housing and job training. These linkage contributions will be made in accordance with the terms of a DIP Plan Agreement entered into between the BRA and the College.

5.2 Anticipated Employment Levels

5.2.1 Construction Jobs

Temporary employment opportunities will be provided during the construction phases of the Project. It is estimated that at the peak construction period, 150 construction workers will be employed. The breakdown of the estimated construction workers for each construction period is as follows:

Construction Period	Construction Workers
July 1993	20
December 1993	50
September 1994	100
December 1994	150
September 1995	20

5.2.2 Permanent Jobs

The completion of the Project will provide additional permanent employment opportunities. The College plans to increase its faculty and staff by 10 to 20 positions over the next ten years.

5.3 Public Benefits

The College has entered into discussions with abutters, residents, and neighborhood groups regarding methods through which the College can better communicate and participate in a more positive manner with the neighborhood. The College has had a long and successful relationship with the Boston School System, the City of Boston, Mission Hill, and with communities outside of Boston. These activities and commitments are discussed below.

5.3.1 Mission Hill Rental Housing Data-Base

Many Mission Hill property owners have requested that the College provide a means of providing local rental housing information to students. Therefore, the College is prepared to establish a Mission Hill Rental Housing Data-base. The College will solicit rental housing information from Mission Hill property owners (address, owner, size of unit, monthly rent, significant features, etc.), create a data-base, and make the data-base available to all College students. The program is designed to provide students with information about housing accommodations within walking distance, and property owners with direct marketing assistance to students from the College. The program and data-base can be expanded to other Boston neighborhoods as necessary; however, the Mission Hill neighborhood is the primary target area.

5.3.2 Community Scholarship Nominating Committee

The College has committed to establishing a Community Scholarship Nominating Committee which will work with the College to identify Mission Hill residents who may take advantage of the College's many scholarship programs. The College will work with Committee members to inform local high school students of scholarships, grants, financial aid and other programs that are available in order to attend the College. The Committee will be made up of community representatives, including but not limited to students, parents, local school officials, neighborhood organizations and the College. The Nominating Committee will give preference to Mission Hill residents, students of Mission Hill area schools, and other City of Boston residents.

5.3.3 Student Mentor Program

The College has committed to expand its current College - local school matching program to include a Mission Hill school. The selection of a school match will be made jointly by representatives of Mission Hill; the College and school officials. (See Section 5.3.5 for more details on existing collaboration programs.)

5.3.4 Payment In-Lieu of Taxes (PILOT)

The College has reached an agreement with the Assessing Department of the City of Boston to establish a PILOT program which includes a new full scholarship to a City of Boston resident. The PILOT has a total value of approximately $104,000. Other PILOT commitments include:

- **Community Corps** - Discussions between the College and the community identified a need to coordinate the efforts of College communities, organizations, and fraternities for community participation with needs of the community. The College has committed to organize and coordinate a year-round program that will match student participation with the needs of community based non-profit and/or neighborhood groups; and

- **Purchasing Coordinator** - The College has committed to assign a coordinator to advertise, solicit, and inform community based vendors and suppliers for the purchases of goods and services by the College.

5.3.5 Cooperation Agreement

The College and the BRA have entered into a Cooperation Agreement dated May 27,1993, which sets forth community benefits and services in connection with the Project.

5.3.6 The College and the Boston Public Schools Collaboration

As a charter member of the Boston Higher Education Partnership, the College has been involved in efforts to assist the Boston Public Schools by improving the educational climate and offerings in the city during the past eighteen years. In supplementing funds provided by the Commonwealth under its Chapter 636 legislation, the College has contributed the equivalent of more than $275,000 in administrative and instructional support during the last eight years alone.

From 1975 to 1988, the College was paired with the Charles E. Mackey Middle School, located at 90 Warren Avenue in Boston's South End. As the mission of the Mackey School evolved over the years, from a magnet school in the arts and humanities to a school whose emphasis was on two-way bilingual education, the College's administration, faculty, and students helped to design and implement such programs as:

- A state-of-the-art language laboratory
- Curriculum support for science and English teachers

- An annual school-wide science fair
- A basic skills learning center
- A drug abuse education program
- Elective courses in the humanities
- Multi-cultural arts programming
- Technical assistance to Mackey's faculty and administration

In 1980, an independent evaluator called the pairing "exceptionally successful" because the College "has not only supported but actively helped the school and parents define Mackey's magnet theme." In a report to the Boston School Department, the Mackey administration described the College as "an excellent resource", which "has provided us with continuity through many administrative and staffing changes."

In 1988, the Mackey Middle School was closed by the Boston School Committee and the College was re-paired with the Umana Barnes Middle School on Border Street in East Boston. The new program with the Umana Barnes Middle School concentrations on science and laboratory tutoring. Students from the College visit the Barnes School approximately three days per week during the school year to assist Boston teachers with laboratory preparation and to provide tutoring for the 6th, 7th and 8th-grade students.

The College employs a part-time Coordinator to supervise the tutors and to assist the Barnes science faculty with curriculum planning. Other aspects of this unique partnership include:

- A Laboratory Manual prepared by the College for Barnes students
- Tutoring in both Spanish and English
- A Career Day visit to the College for 8th-grade students
- Field trips to the Science Museum and New England Aquarium's Harbor Exploration Program

In the fall of 1992, the College began an additional partnership with the Fenway Middle College High School in Charlestown. In collaboration with the Melville Corporation, which operates CVS pharmacies, the College provides curriculum and organizational support for an innovative 4-year college preparatory program designed to groom minority students for careers in pharmacy and the health professions. A monitoring program, career awareness workshops, and special courses are being developed by faculty from the College and the Boston Public Schools, working with practicing professionals in health-related fields.

The College's Nursing program provides direct services to health practitioners in the following public schools and neighborhood health centers:

- Brighton High School
- Boston Latin School
- Edwards Middle School in Charlestown
- Barnes Middle School in East Boston
- Bunker Hill Community Health Center in Charlestown
- Dimock Health Center in Roxbury
- Rosie's Place in Boston

Registered Nurses, who are enrolled in the Bachelor in Science for Nursing (B.S.N.) program at the College, assist in these settings as part of their required clinical experience.

The College is an active participant in many other community, educational and civic projects and programs throughout the Greater Boston Area.

5.3.7 Mission Hill and Boston Programs

Among the students, faculty and staff of the College, many committees and individuals actively participate in ongoing community, educational and civic projects and programs. The College encourages its students and members to be involved in community service as a means of appropriate preparation for a responsible career serving the public. The College attempts to reach out to the local Mission Hill community as its nearest neighbor and has established several successful relationships with local programs and projects. A sampling of the programs and projects in which the College participates in the Mission Hill and Boston area are as follows:

- **Organizational Support -** The College provides a room for the Adult ADD group of Greater Boston to meet in as part of Boston Against Drugs. The College has participated in the Boston Against Drugs/Mission Hill Day at the Tobin School. Members of the Phi Delta Chi fraternity of the College contributed their time and effort in providing an information booth, blood pressure screening, and drug information to participants. The College's Public Relations office also participated by providing refreshments and nutritional information.

- **Day Care -** The College is sponsoring and funding day care for one child at the Ellen Jackson Children's Center for one year (1992). The day care center, located on Annunciation Road in Mission Hill is a pre-school providing year round care for children ages 2 to 6.

- **Food Project Committee** - The Food Project Committee is a group of representatives from each of the institutions and schools in the LMA who raise funds for area food pantries and community groups. The Food Committee conducts two food drives on campus annually, one in the fall and one in the spring. The food collected is donated to a Mission Hill food pantry. Additionally, the Food Project Committee coordinated a pilot project with the Tobin School and Boston Urban Gardeners during the summer of 1992. This program employed youths from the Mission Hill area, taught them gardening skills and raised vegetables for the ABCD Food Pantry.

- **Furniture and Computer Donations** - The College's Public Relations Office often coordinates donations of computers and surplus furniture to charitable organizations. Recent donations include library furniture donated to the Tobin Elementary School in Mission Hill.

- **Mission Hill Summer Program** - In conjunction with the Phillips Brooks House Association Inc., the College gives financial support to the Mission Hill Summer Program targeted to the educational and multi-cultural day camp, which is made available to children of the Mission Main Housing Project.

- **Project ProTech** - The College provides meeting space and program sponsorship to Project ProTech. Project ProTech is a four year, school-to-work transition program which prepares students from Boston, Brighton and English High Schools for careers in health care. Currently 50 high school seniors and 70 juniors are enrolled in the program.

- **Recycling** - The College organized a recycling committee in 1991 and began recycling paper, envelopes, etc. during the last academic year. The residence hall recycles cans and bottles in coordination with Boston CAN, a federally funded program to assist homeless individuals.

5.3.8 Other Community and Educational Programs and Projects

In addition to Boston based projects, the College and its personnel participate in many programs outside of the City, including:

- **Media Interviews** - On a regular basis, members of the College's faculty provide expert opinions and participate in interviews conducted by the print and broadcast media. These interviews are on a wide range of health care/drug topics and provide unbiased, valuable health care information to the public.

- **Medication Awareness Month** - Annually, the College joins forces with several state health organizations to observe Medication Awareness Month. This past year's activity included a kickoff, brown bag event held at the Somerville Young at Heart Senior Center where the College students discussed medication concerns with the elderly.

- **National Scleroderma Foundation** - College faculty author a question and answer column in the newsletter published by the national Scleroderma Foundation.

- **Project Eldermed** - Ambulatory Externship Program students visit senior centers and elderly housing complexes in the Boston area and across the state to conduct brown bag programs, discuss prescription medication, and distribute information packets which provide written material on the proper use of prescription drugs. Project Eldermed is a joint effort between the College, and the Department of Public Health, Division of Elderly Health.

- **Project Excellence** - In 1992, the College awarded a full tuition, room and board scholarship. This program rewards black students in the Washington, D.C. metropolitan area who excel academically.

- **Brown Bag Programs** - The popular brown bag programs are conducted on an ongoing basis by members of the College faculty and students. This program provides an opportunity for individuals to discuss their individual prescription medicine concerns with a registered pharmacist/or student. Programs have been held at Uphams Corner, the State House and several senior centers around the state.

5.3.9 Ongoing Community Activities

The College has ongoing commitments to a number of community activities. These include:

- **March of Dimes Birth Defects Foundation** -The College has been recognized for its generosity and continued outreach contribution to this Foundation.

- **Massachusetts Society of Medical Research** - The College gives financial support to the Massachusetts Society for Medical Research.

- **Perkins School for the Blind** - The College has provided financial support to the Perkins School for the Blind.

- **Pine Street Inn** - As well as conducting clothing and food drives for the Pine Street Inn, sponsored by the College and its fraternities, the College has provided financial support to the shelter.

- **Police Alliance of Boston** - The College donates funds annually to this organization, comprised of members of the Boston Police Department, which provides programs to needy city children.

- **Medi-Message Drug Information Hotline** - This program is a free, "hotline" for the public, which provides information on over 100 commonly prescribed medications. The service is available 24-hours a day. This service is highly regarded in the community. Brochures have been distributed to local pharmacies, community and elderly centers, and are available to the public free of charge. This service has been featured in *Family Circle*, *Good Housekeeping*, *The Patriot Ledger*, *The Boston Globe*, WCVB-TV Channel 5, and other media outlets.

- **Scholarship Aid** - The College budgets annually for scholarship aid available to all students on a need basis. Additional funds are available for other than need based aid.

  One particular scholarship, the Carol DiMaiti Stuart Scholarship provides for free tuition in any degree program offered by the College. Eligible applicants must be residents of the City of Boston and graduates of a Boston high school. Priority is given to residents of Mission Hill.

- **United Way of Massachusetts Bay** - College employees contributed during the last three years to funding drives conducted by the United Way.

6.0 REGULATORY CONTROLS AND PERMITS

6.1 Zoning Relief Required for the Project

The Site is located within the H-3 Zoning District, according to the zoning controls which are currently in effect. A summary of the Zoning controls which apply within the H-3 Zoning District is set forth below in Table I-2.1.

Under current zoning, conditional use permits would have to be issued to authorize the intended uses for the Project, as well as variances from the parapet, rear and side yard setback requirements which are applicable within the H-3 Zoning District.

The zoning controls proposed for the College's Campus, which is located within the LMA, are set forth in zoning text and map amendments to the Boston Zoning Code, which have been approved by the BRA and will be submitted to the Zoning Commission for adoption. The College's Master Plan, entitled "Massachusetts College of Pharmacy and Allied Health Sciences Facilities Master Plan", dated May 1993 (the "Master Plan") which details its plans for development and use of the Site for the next ten years, has been approved by the Mission Hill PZAC and BRA, and will be submitted for approval by the Zoning Commission. These amendments, together with the Master Plan, which incorporates by reference the College's DIP Plan and the Project as described in this FPIR/FEIR, set forth the zoning controls proposed to be in effect within the Massachusetts College of Pharmacy and Allied Health Sciences Institutional District, which includes this Site. The maximum allowable FAR within the Massachusetts College of Pharmacy and Allied Health Sciences Institutional District will be 3.0, and maximum allowable height will be 155 feet. Development within this Institutional District will be allowed provided that the Zoning Commission adopts these zoning controls, the development is consistent with the Master Plan, the DIP, and the Development Impact Review Requirements set forth in Article 31 of the Zoning Code as they are proposed to apply to the College's Institutional District. The zoning controls proposed to be applicable to the College's use and development of its Campus are consistent with the BRA's plan for institutional development within the LMA as a whole.

6.2 Anticipated Permits

State and Federal Agencies from which non-zoning permits or other actions have been or may be sought are described below.

(Please note that each permit listed will be filed unless further analysis shows that such permit or action is not required. Additional permits may be needed as the building design proceeds further.)

Permit or Action Required

Agency Name	Anticipated Permit or Action
FEDERAL	
Environmental Protection Agency	- Pre-Asbestos Removal Notice - NPDES Permit
STATE	
Massachusetts Executive Office of Environmental Affairs	- MEPA Compliance - Environmental Notification Form - Environmental Impact Report
Massachusetts Department of Environmental Protection:	
- Division of Air Quality Control	- Fossil Fuel Utilization Permit - Pre-Demolition Notice - Pre-Asbestos Removal Notice - Pre-Construction Notice - Vent Hoods for Laboratory Space Permit
- Division of Water Pollution Control	- Sewer Connection/Extension Permit
- Division of Water Supply	- Water Supply Permit
Massachusetts Water Resources Authority	- Industrial User Sewer Discharge Permit
Department of Labor and Industries	- Asbestos Removal Permit
MIFA/BIDFA	- Bonding Indebtedness/Financing

Permit or Action Required

Agency Name	Anticipated Permit or Action
LOCAL	
Boston Transportation Department	- Transportation Access Plan Approval - Construction Traffic Management Plan
Boston Water & Sewer Commission/Department of Health and Hospitals	- Water & Sewer Tie-In Approval - Temporary Discharge Permit
Boston Inspectional Services Department	- Demolition Permit - Building Permit
Boston Licensing Board	- Storage of Inflammables - License to Erect and Maintain a Parking Garage
Boston Air Pollution Control Commission	- Compliance with Construction Noise Regulations
Boston Department of Public Works/Public Improvements Commission	- Easements for Street/Sidewalk Alteration/Encroachments Permit - Street Occupancy Permit - Curb-Cut Permit
Boston Fire Department	- Flammable Storage Permit - Approval of Fire Safety Equipment - Certificate of Registration
Boston Department of Health and Hospitals	- Approval of Plans for Asbestos Removal

7.0 COMMUNITY REVIEW

The College has voluntarily agreed to submit the Project through a public review process under the provisions of Article 31 of the Boston Zoning Code, has undertaken extensive community review of its Institutional Master Plan, and has presented informatin of the Project's environmental and transportation effects to abutters, individuals from the adjoining neighborhoods, and community groups. Under the provisions of Article 31 and the Master Plan review, the College has submitted the following documents for public review and comment:

Document	Date Submitted
Project Notification Form (PNF)	1/13/93
Environmental Notification Form (ENF)	2/1/93
Draft Project Impact Report (DPIR/Draft Environmental Impact Report (DEIR)	3/31/93
Draft Institutional (Facilities) Master Plan	4/15/93
Final Institutional (Facilities) Master Plan	5/27/93
Final Project Impact Report (FPIR)/Final Environmental Impact Report (FEIR)	6/1/93

In addition to the formal review process, the College has conducted a thorough community outreach process of meetings, briefings, and written material in order to fully inform the adjacent community of the Project and its effects. The intention of the College has been to gather public comment as appropriate and attempt, using best faith efforts within design and budget constraints, to respond to questions and concerns raised about the Project.

7.1 Interested Parties

In addition to a thorough analysis and review by agencies of the City of Boston, and the Commonwealth of Massachusetts, the College has identified several individuals, community groups, abutters, and institutions that may have an interest in the Project. The following is a list of identified interested parties, and City and State agencies:

Name	Relationship
Massachusetts College of Art	Abutter
Harvard Medical School	Abutter
Longwood Medical Research Center (The Brigham and Women's Hospital, Inc.)	Abutter
Boston Latin High School	Abutter
Mission Hill Planning and Zoning Area Committee	Community Organization
Mission Hill Neighborhood Housing Services	Community Organization
Fenway Area Community Groups	Community Organization(s)
Medical Academic and Scientific Community Organization, Inc. (MASCO)	Professional Organization
Building and Construction Trades Council of the Metropolitan District	Professional Organization
Honorable David Scondras	City Councillor
Honorable John Nucci	City Councilor
Honorable Albert L. O'Neil	City Councilor
Honorable Rosaria Salerno	City Councilor
Honorable Kevin Fitzgerald	State Representative
Boston Environment Department	City Agency
Boston Redevelopment Authority	City Agency
Boston Assessing Development	City Agency
Boston Transportation Department	City Agency
Boston Zoning Commission	City Agency

Name	**Relationship**
Boston Water and Sewer Commission	City Agency
Boston Industrial Development Finance Agency	City Agency
Mayor's Office of Neighborhood Service	City Agency
Massachusetts Industrial Finance Agency	State Agency
Massachusetts Department of Environmental Protection	State Agency
Massachusetts Water Resources Authority	State Agency
Massachusetts Executive Office of Economic Affairs	State Agency
Massachusetts Bay Transportation Authority	State Agency
Massachusetts Executive Office of Environmental Affairs, MEPA	State Agency

7.2 List of Meetings

The following is an updated listing of Project meetings and/or Project presentations that have occurred or are scheduled by the College for the Project:

Group/Person	**Meeting Date**
Boston Redevelopment Authority Board	5/27/93
Boston Redevelopment Authority	12/14/92; 12/24/92; 1/8/93; 1/25/93; 2/19/93; 2/26/93; 3/25/93; 3/30/93

Group/Person	**Meeting Date**
Boston Redevelopment Authority Institutional Planning and Urban Design Staffs	1/13/93; 1/21/93; 2/12/93; 2/26/93; 5/7/93
Boston Civic Design Commission	3/2/93; 4/93; 5/4/93
Boston Civic Design Commission Sub-Committee	3/23/93; 4/1/93
Boston Building and Construction Trades Council	2/25/93; 5/25/93
Mission Hill Planning and Zoning Area Committee	3/2/93; 4/93; 5/4/93
Mission Hill Planning and Zoning Area Committee - Development Subcommittee	2/25/93; 4/1/93; 4/8/93
Fenway Area Community Groups	4/26/93
Boston Latin School	12/9/92; 3/25/93; 5/4/93
Harvard Medical School	2/4/93; 4/8/93
City Councilor David Scondras	12/16/92
State Representative Kevin Fitzgerald	12/15/92; 2/22/93; 5/6/93
MASCO	12/17/92; 4/16/93
Mayor's Office of Neighborhood Services	12/14/92; 2/24/93; 3/16/93; 4/26/93; 5/27/93
Massachusetts Executive Office of Environmental Affairs (MEPA Unit) Consultation Session	3/3/93
Massachusetts Industrial Finance Agency	11/24/92
Boston Industrial Development Finance Agency	12/11/92; 5/21/93

Group/Person	Meeting Date
Boston Transportation Department	1/14/93; 4/23/93
Boston Assessing Department	4/22/93; 5/25/93
Kathryn and Oscar Brookins	4/22/93
Marie Fabiano	4/22/93
Massachusetts College of Art	4/8/93

III. TRANSPORTATION ANALYSIS

III. TRANSPORTATION ANALYSIS

The College has evaluated the effects associated with the Project on the local transportation network. The results of this evaluation, which respond to (1) the Scopes issued by the Boston Transportation Department (BTD) and the EOEA MEPA Unit, and (2) the Preliminary Adequacy Determination on the DPIR issued by the BRA and the Certificate on the DEIR issued by EOEA, are set forth below. The analysis includes the following:

- A definition of existing traffic, transit, and parking conditions.
- An evaluation of the Project's long-term effects on traffic, transit, and pedestrian activities as well as on parking demand, in the context of the College's future transportation policies and goals.
- Identification of, and commitment to implement appropriate measures to mitigate Project effects.
- An evaluation of the Project's short-term effects on traffic related to construction activity.

The transportation analysis will form the basis for a Transportation Access Plan (TAP) and TAP Agreement to be executed with the BTD.

1. EXISTING CONDITIONS

1.1 Traffic Study Area

The College is located along the eastern edge of the LMA. The Site and its relationship to the surrounding street system are shown in Figure III-1.1. A total of four (4) major arterials (Huntington Avenue, Longwood Avenue, Brookline Avenue, and the Fenway) and local streets (Palace Road and Avenue Louis Pasteur) serve the Site.

The study area was discussed with BTD, BRA and MEPA, and they have concurred on the study area shown in Figure III-1.1. It includes a total of 5 intersections which are:

	Location	Status
1.	Longwood Avenue at Huntington Avenue	Signalized
2.	Longwood Avenue at Brookline Avenue	Signalized
3.	Longwood Avenue at Parking Lot/Palace Road	Unsignalized
4.	Longwood Avenue at Avenue Louis Pasteur	Unsignalized
5.	Avenue Louis Pasteur at Fenway	Unsignalized

1.2 Major Roadway Characteristics

Longwood Avenue is a bi-directional (east-west) arterial roadway, 42 to 34 feet wide consisting of one westbound and one eastbound lane* which begins at Huntington Avenue and travels westerly through Brookline. Longwood Avenue provides primary access to not only the College, but to Children's Hospital Medical Center and the Harvard Medical School. Longwood Avenue intersects Palace Road and Avenue Louis Pasteur at two unsignalized intersections to the west and east, respectively, of the Site. Both of these local collector roadways connect Longwood Avenue to the Fenway.

Further west, Longwood Avenue meets Brookline Avenue at a signalized intersection. Brookline Avenue is a major (north-south) arterial roadway which carries heavy commuter traffic during the morning and evening peak periods. Brookline Avenue also carries a substantial amount of patients, visitors and service-related traffic to LMA hospitals throughout a typical weekday. Brookline Avenue is approximately 60 feet wide consisting of two (2) northbound, two (2) southbound lanes, and a center two-way left-turn lane.

Huntington Avenue is also a major (north-south) arterial roadway which carries heavy commuter traffic during the morning and evening peak hours. The MBTA Arborway line runs in both directions along Huntington Avenue with the closest T-stop to the College at the intersection of Longwood Avenue and Huntington Avenue. Huntington Avenue has two travel lanes in each direction on either side of the MBTA dedicated median. Parking is not allowed at the intersections where left-turning lanes exist, but metered parking is present in many locations along both Longwood Avenue and Huntington Avenue.

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* Longwood Avenue widens to 42 feet (from Brookline Avenue to Binney Street), but then narrows to 34 feet at Blackfan Street. It has an exclusive left-turn lane eastbound and westbound at Brookline Avenue.

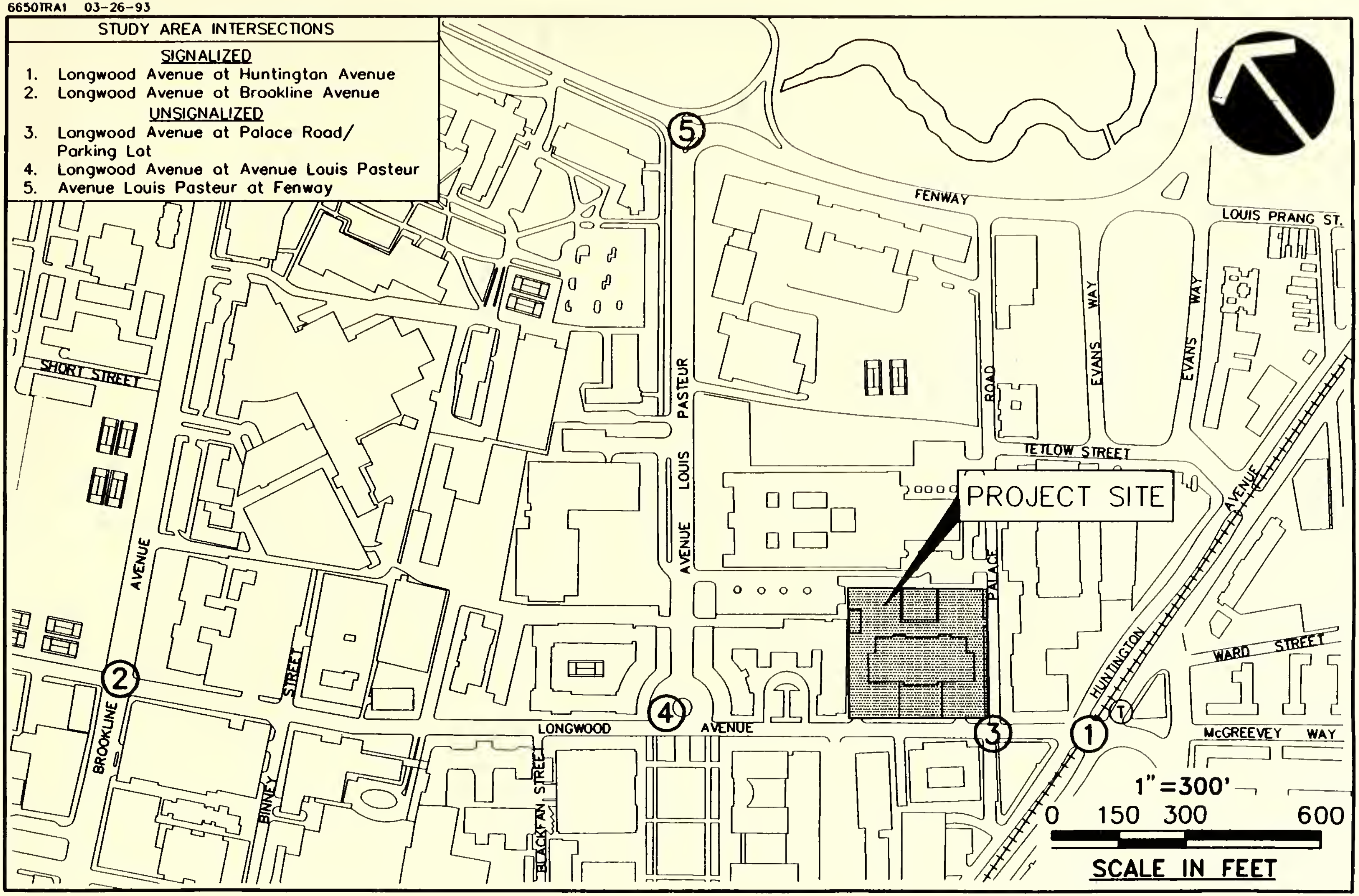

Figure III-1.1
Study Area
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

Avenue Louis Pasteur is a major connector between Longwood Avenue and the Fenway, and serves the Boston Latin High School. A number of off-street parking areas are accessed from Avenue Louis Pasteur, including those at Boston Latin, Simmons College, and Emmanuel College. Avenue Louis Pasteur contains one travel lane in each direction.

Palace Road extends between Longwood Avenue and the Fenway. Palace Road provides access to the College. It is one-way north from Longwood Avenue with one northbound lane and one parking lane. Parking is allowed at meters located along the westerly sidewalk; parking is prohibited on the easterly side.

1.3 1993 Existing Traffic Volumes

Traffic volume data for the five (5) study area intersections was obtained from two sources. Data for the three unsignalized intersections were obtained by HMM through manual traffic counts conducted on Thursday, February 4, 1993 and Wednesday February 10, 1993. These turning movement counts were taken during the 7:00 to 9:00 AM, and the 4:00 to 6:00 PM weekday peak hours. Manual counts for the two signalized intersections were conducted by Vanasse Hangen Brustlin (VHB) for MASCO in 1991. All traffic data collected is shown in Appendices C, D, and E of the DPIR/DEIR. The traffic engineers adjusted and balanced the intersection volumes where possible. Adjacent intersections having numerous midblock driveways or garage entrances were not balanced. This method of balancing was used so that vehicle flows from one location to the next could be verified. The following Figures III-1.2 and III-1.3 show the AM and PM 1993 existing traffic volume flow.

1.4 1993 Existing Traffic Operations

Traffic operations were analyzed according to standard procedures and practices outlined in the 1985 Highway Capacity Manual. The efficiency of traffic operations at a location (or changes in traffic operations), is measured in terms of Level of Service (LOS). The LOS refers to the quality of traffic flow along roadways and at intersections. It is described in terms of Levels A through F; where A represents the best possible free-flow traffic conditions, and F represents congested, forced-flow or failing conditions.

6650AMEX 03-30-93

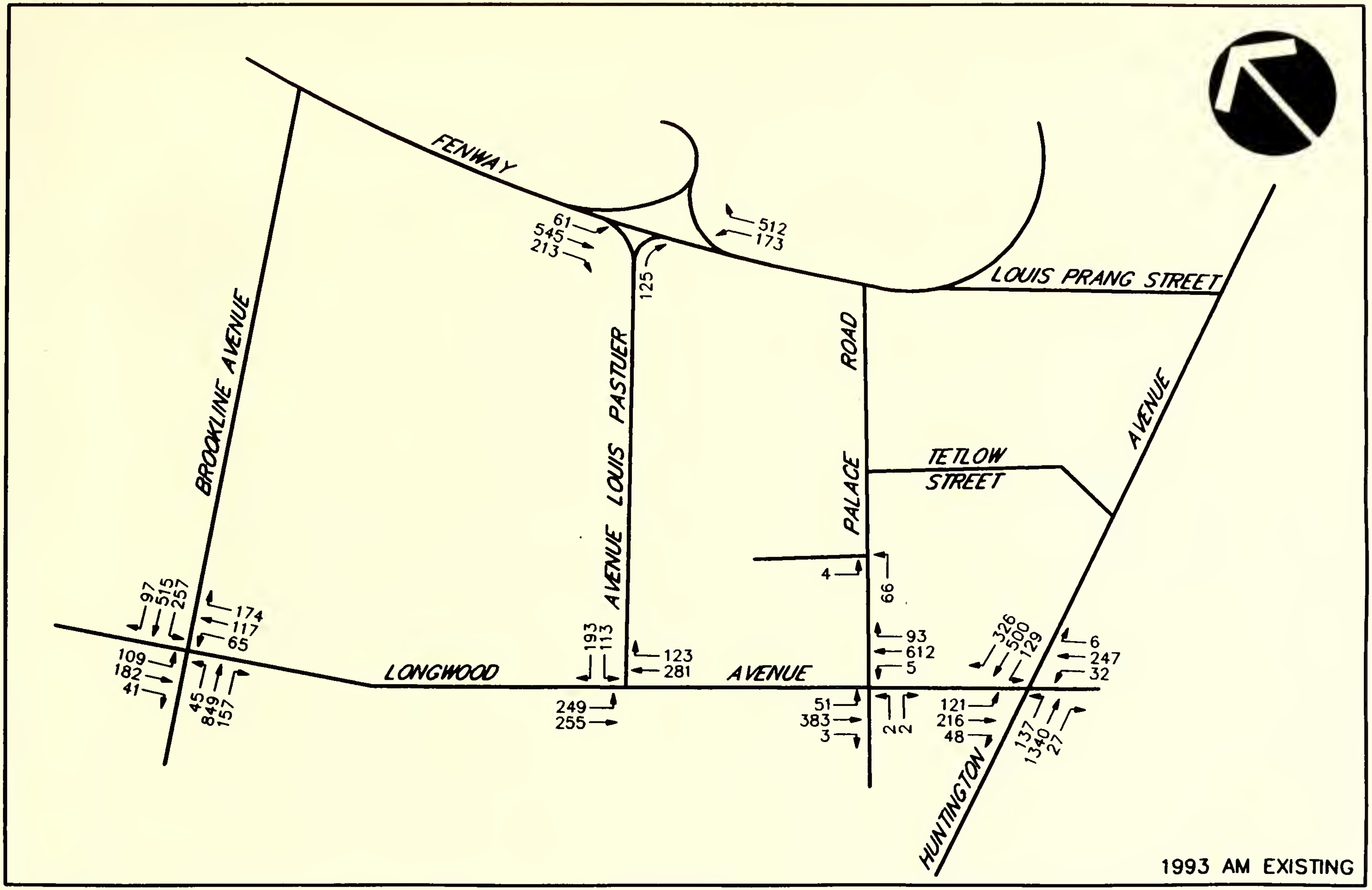

Figure III-1.2
1993 Existing AM Peak Hour Traffic Volumes
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

6650PMEX 03-30-93

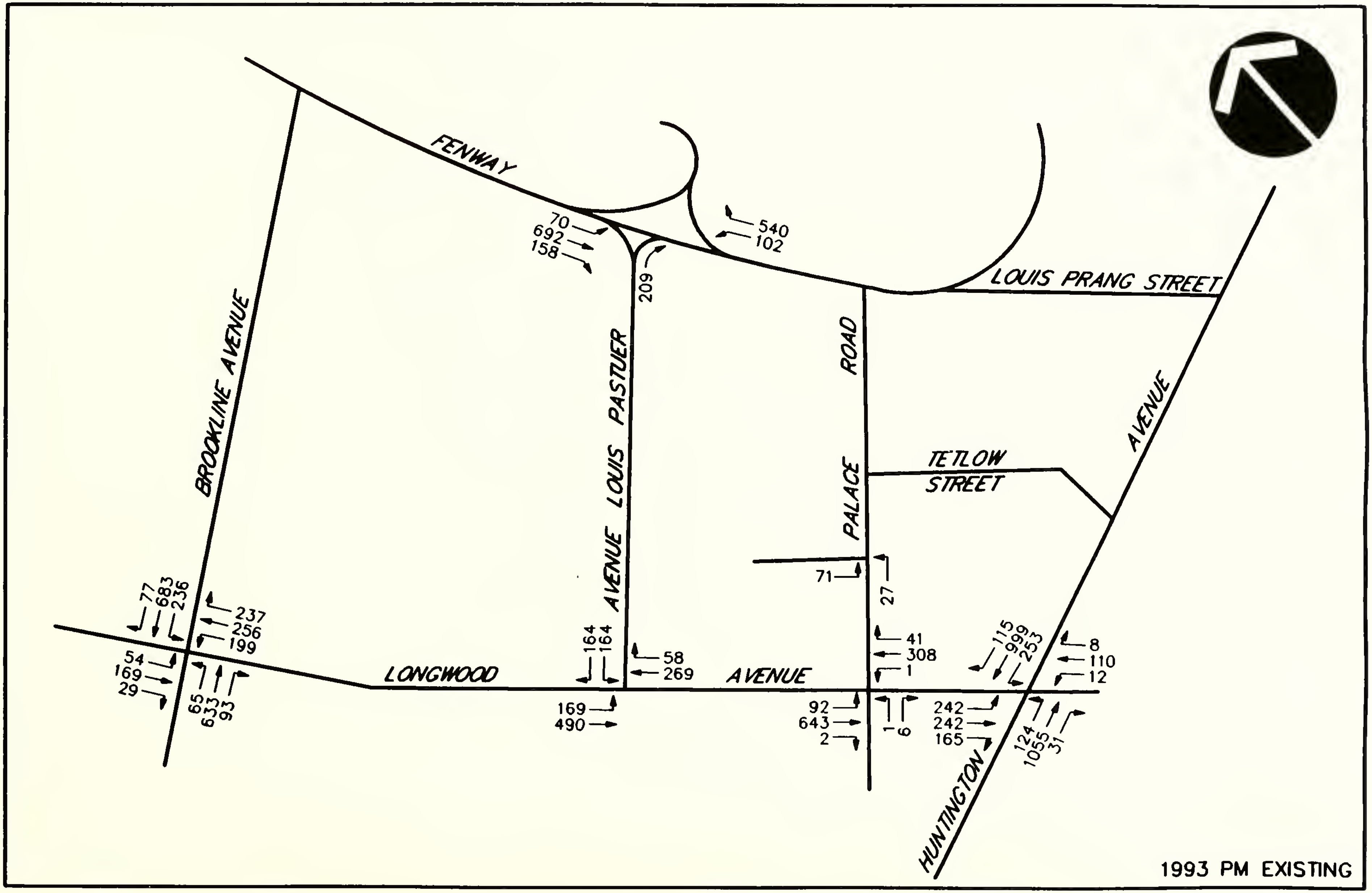

Figure III-1.3
1993 Existing PM Peak Hour Traffic Volumes
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

At signalized intersections, LOS is defined in terms of average approach delays. For unsignalized intersections, reserve capacities are used to determine LOS. These measures are discussed briefly below, and Table III-1.1 summarizes their interrelationships. Average delay measures the mean stopped delay experienced by vehicles entering a signalized intersection during the peak hour period. Average delay is measured for each individual approach and for the intersection as a whole. The LOS stated deteriorates with increasing average delays.

At unsignalized intersections, LOS is defined in terms of reserve capacity. The reserve capacity is the unused capacity of (an) approach lane(s) to an intersection. This measure, defined as passenger car per hour, indicates how many more vehicles would be required to bring the intersection approach lane(s) to capacity. The LOS stated deteriorates with reducing reserve capacity values.

Table III-1.2 shows the 1993 existing levels of service for the five (5) study area intersections.

During the morning peak hour, Longwood Avenue's intersection with Brookline Avenue operates at an acceptable LOS C. By comparison, Longwood Avenue's intersection with Huntington Avenue operates under LOS F conditions, with particularly long delays experienced (over three minutes). At the three unsignalized intersections, all but one approach operates at LOS C or better. At this approach, the left turns from Avenue Louis Pasteur onto Longwood Avenue operate at LOS E during the AM peak hour.

During the afternoon peak hour, delay times at Longwood Avenue's intersection with Brookline Avenue decreases to LOS D, while LOS at the Longwood Avenue/Huntington Avenue intersection remains at LOS F. Left turns onto Longwood Avenue from Avenue Louis Pasteur declines from LOS E to LOS F, with all other unsignalized movements continuing to operate at LOS C or better in the afternoon.

1.5 1993 Existing Trip Characteristics

Faculty/Staff Trip Characteristics - The current staff level at the College is 150 on-campus employees. Based upon a travel survey conducted by HMM Associates in February 1993, 78.3% of the College's employees currently drive to work (although not all arrive during the morning peak hour or depart at the afternoon peak hour), while the remaining use alternative transportation such as MBTA surface transit and bus services, walking, and other forms as shown in Table III-1.3.

Table III-1.1: Level of Service (LOS) Designations*

Category	Description	Delay Range** (Seconds/ Vehicle)	Reserve*** Capacity (Vehicles/ Hour)
LOS A:	Describes a condition of free flow, with low volumes and relatively high speeds. There is little or no reduction in maneuverability due to the presence of other vehicles, and drivers can maintain their desired speeds with little or no delay.	0.00-5.0	400+
LOS B:	Describes a condition of stable flow, with desired operating speeds relatively unaffected, but with a slight deterioration of maneuverability within the traffic stream.	5.1-15.0	300-399
LOS C:	Describes a condition still representing stable flow, but speeds and maneuverability begin to be restricted. The general level of comfort begins to deteriorate noticeably at this level.	15.1-25.0	200-299
LOS D:	Describes a high-density traffic condition approaching unstable flow. Speeds and maneuverability become more seriously restricted, and the driver experiences a poor level of comfort.	25.1-40.0	100-199
LOS E:	Represents conditions at or near the capacity of the facility. Flow is usually unstable, and freedom to maneuver within the traffic stream becomes extremely difficult.	40.1-60.0	0.99
LOS F:	Describes forced flow or breakdown conditions with queuing along critical approaches. Operating conditions are highly unstable as characterized by erratic vehicle movements along each approach.	60.1 or greater	N/A

* Source: Transportation Research Board, Highway Capacity Manual, Special Report 209, 1985.

** Delay ranges relate to the mean stopped delay incurred by all vehicles entering the intersection and do not consider the effects of traffic signal coordination. This criteria is intended for use in the evaluation of signalized intersections.

*** Reserve capacity refers to the unused capacity of the minor approach, on a per-lane basis. This criteria is limited to use in the evaluation of unsignalized intersections.

Table III-1.2: Existing Peak Parking Generation

Full-Time Employees	Auto Mode Split	Auto Occupancy	Daily Autos (One-Way)	Turnover Rate (Utilization)	Employee Parking Demand (Long-Term)
150	78%	1.0	117	1.03	114 spaces

On-Campus Students	Auto Mode Split	Auto Occupancy	Daily Autos (One-Way)	Turnover Rate (Utilization)	Student Parking Demand
575	30%	1.0	173	1.89	92 spaces

Employee Parking Demand	+	Student Parking Demand	=	Total Parking Demand
114 spaces		92 spaces		206 spaces

Table III-1.3: Modal Share

MODE	Faculty/Staff	Students
Auto	78.3	30.1
Transit	12.0	21.5
Taxi	0.0	0.3
Walk/Bicycle	5.4	42.3
Other	4.3%	5.8%
TOTAL	100.0%	100.0%

Student Trip Characteristics - According to the College Administration, approximately 575 students are found on Campus on any given day. Based upon the HMM Associates' 1993 travel survey, approximately 70% of the College's students use alternatives form of transportation, with 42% walking or bicycling to school. The remaining 30 percent of students drive to school as shown in Table III-1.3.

1.6 Parking

A total of 150 surface parking spaces are currently located on the Site. Approximately fifty (50) spaces are located in front of the White Building. Another fifteen (15) spaces are located on the west side of the Garage/Office Building adjacent to the LMRC. The remaining eight-five (85) spaces are located to the rear of the White Building.

A 12-hour survey (6:00 AM to 6:00 PM) was conducted on Thursday, February 18, 1993, and the following information was calculated. The actual data is shown in Appendix D of the DPIR/DEIR. A parking demand bar chart is shown on Figure III-1.4.

- The parking capacity on the Site is 150 spaces. By 7:00 AM, 31% of the total spaces are occupied. Peak occupancy occurs at 11:00 AM, when 84% of the spaces are occupied.

- 50 of the 150 spaces are reserved for students.

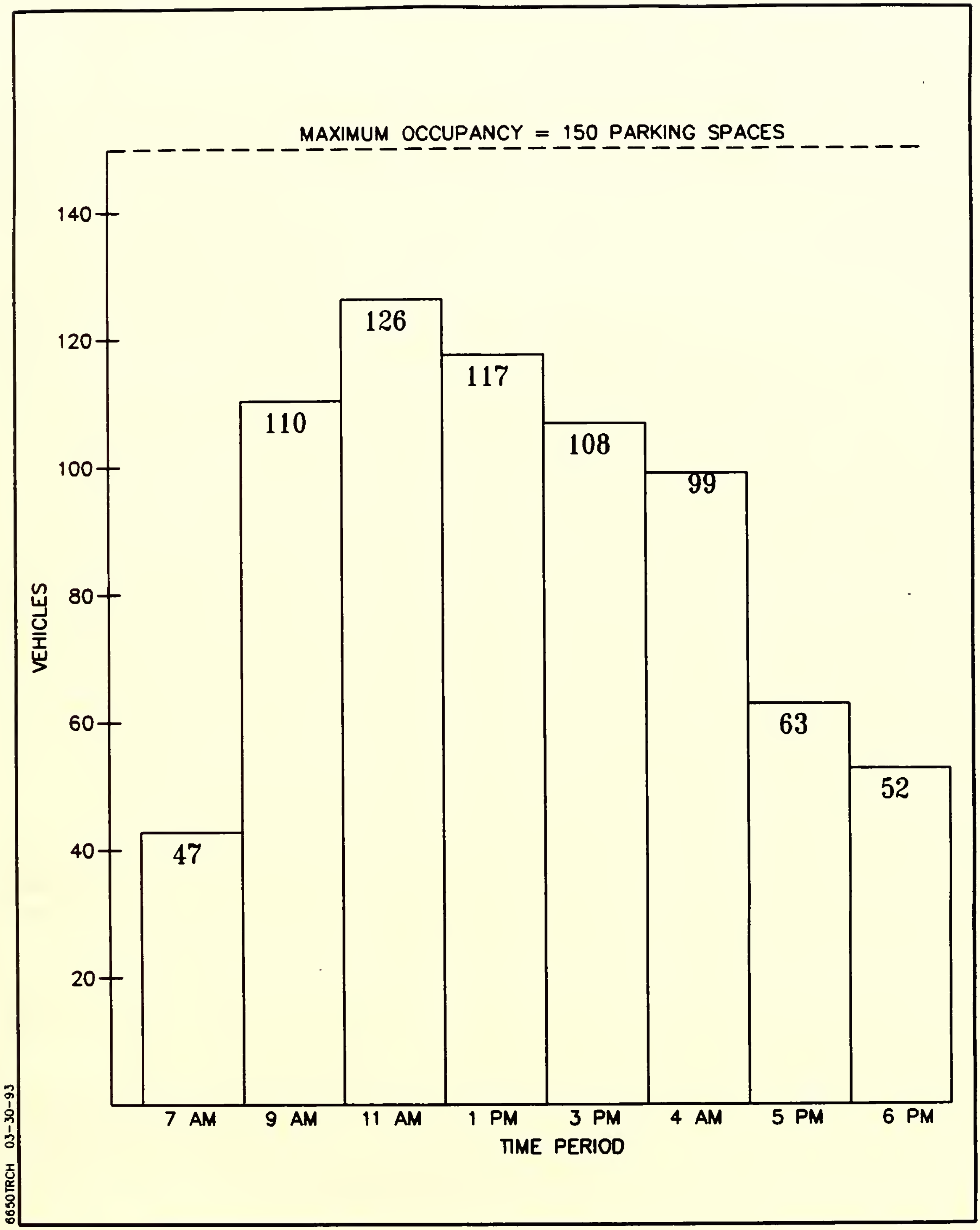

Figure III-1.4
Existing Parking Demand at the College's Parking Lots
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

- The parking space turnover (utilization) for all three lots averaged 1.5 vehicles per space. However, in order to provide a conservative estimate of demand, a rate of 1.03, the observed rate for the Longwood Avenue lots, has been used for faculty and staff assignments. A rate of 1.89, the Palace Road rate, has been used for students. Figure III-1.4 displays the resulting existing demand. This indicates an 80-space excess of demand (206 spaces) over the observed parking use (126 spaces). This shortfall, which primarily effects students, is met by use of both on-street and off-street parking spaces in or near the LMA.

- The single-lane entry, exit driveway at the lot operates at a very good level of service due to the guard's ability to direct traffic flow in and out, as well as minimum demand.

1.7 Transit

The Massachusetts Bay Transportation Authority (MBTA) provides two branches of the rapid transit system into the LMA. These two branches join with others to form the Green Line just outside of Copley Square. The Green Line Station at the corner of Huntington Avenue and Longwood Avenue serves the majority of the College commuters utilizing rapid transit. The College is also served by three MBTA bus routes and by MetroBus, a subsidiary of MASCO. These routes connect to neighborhoods and communities outside of the LMA.

The following three MBTA bus routes serve the College:

- **Bus Route 39:** Provides service between Forest Hill Station and Back Bay Station via Huntington Avenue. Stops on Huntington Avenue near the College are made approximately every 5 minutes during the peak periods.

- **Bus Route 47:** Provides service between Central Station and Andrew Station via Longwood Avenue. Stops are made approximately every 20 minutes during the peak periods.

- **Bus Route 8:** Provides service between Harbor Point/UMass and Kenmore Station via Dudley Square and the South End Medical Area. Stops are made approximately every 20 minutes during peak periods near the front of the College.

The MetroBus provides bus routes to communities outside the LMA for members of Medical Area Institutions. MetroBus Route M2, which serves Harvard Square and other Cambridge points along Massachusetts Avenue, provides service near the College. The M2 route, not limited to peak periods, operates every 10 minutes at rush hour, every 20 to 30 minutes at midday, and every hour at night and on Saturdays.

1.8 Pedestrian Conditions

The pedestrian traffic within the LMA not only consists of people walking to work, schools, and medical facilities, but transit commuters also must walk to/from the T-stops. In addition, a pedestrian walkway behind the College serves pedestrian traffic due to the location of the Boston Latin School.

The pedestrian system in the LMA is well defined, with sidewalks on both sides of the streets, crosswalks at most intersections, and exclusive pedestrian phases at all traffic signals. The major unsignalized pedestrian crossings are midblock at Palace Road, Longwood Avenue, and along Avenue Louis Pasteur.

Pedestrian volumes were observed at intersections in the vicinity of the College in May during the morning peak, mid-day, and evening peak hours. Evaluation of this data concluded that the morning peak hour at Huntington Avenue and Longwood Avenue, and at Longwood Avenue and Palace Road occurs between 7:15 and 8:15 AM. At Palace Road and Tetlow Street, the morning peak hour occurs between 7:30 and 8:30 AM, and at Avenue Louis Pasteur and Longwood Avenue between 8:00 AM and 9:00 AM. The mid-day peak hour at the intersections of Huntington Avenue and Longwood Avenue, Longwood Avenue and Palace Road and Palace Road and Tetlow Street occurs between 1:45 PM/2:00 PM to 2:45 PM/3:00 PM. The mid-day peak at Avenue Louis Pasteur and Longwood Avenue is between 12:45 PM to 1:45 PM. The PM peak hour at all four intersections occurs between 3:00 PM/3:15 PM to 4:00 PM/4:15 PM.

Generally, pedestrian volumes were higher in the morning peak period due to higher concentration of students going to Boston Latin School and employees commuting to work. This volume, however, remains high throughout the day because once people arrive at the LMA, there is a considerable amount of travel between institutions and buildings within the area. The pedestrian walkway, behind the College at Boston Latin School, generates a heavy volume of pedestrian traffic by the Latin School, particularly during the morning peak hour, and when School classes end at 1:45 PM.

2. 1998 NO-BUILD CONDITIONS

The design year presented in this study is 1998 (in accordance with MEPA's 5-year forecast requirement). Forecasts of vehicular traffic for this design year takes into account traffic due to two (2) sources:

- "Background" traffic growth due to developments located outside the study area, but contributing to the traffic network.

- Traffic due to "other developments" (under construction or approved) located within the study area affecting individual intersections.

The combination of both "background" and "other development" traffic with the "Existing" traffic volumes constitutes the No-Build traffic forecast.

2.1 Background Traffic Growth

The "background" traffic growth rate due to developments located outside the study area was based upon two (2) data sources. The first source was the LMA Transportation Study prepared for MASCO by Vanasse Hangen Brustlin, Inc. (VHB), in November 1987. The LMA Study's background traffic growth rate was 0.5%/year. This rate was based upon employment forecasts for Boston, Cambridge, and Brookline.

The second data source was the Beth Israel Hospital's New Clinical Center and Research North, Final Project Impact Report (FPIR) prepared by VHB in November 1992. The AM/PM peak hour manual counts in 1987 were compared to the AM/PM peak hour manual counts taken by VHB in 1991 and 1992.

After reviewing the above data sources, and discussing the results with MASCO, a background traffic growth rate of 1.0% per year was selected. This traffic growth rate is applied to all through-traffic movements on each arterial studied.

2.2 Other Development Traffic

Table III-2.1 lists proposed development projects that are under construction or approved within the College's study areas. The BRA and BTD requested that each of these projects be included in the "No-Build" analysis for this Project. Traffic conditions in the year 1998 were evaluated with the inclusion

Table III-2.1: Other Developments Under Construction or Approved within the Study Area

Map No.	Development Name	Proposed Land Use(s)	Expected Completion Year
1.	Joslin Diabetes Center	Research & Clinical Facility 84,230 SF	1993 +
2.	Brigham & Women's Hospital	Center for Women and Newborns 226,400 SF	1994
3.	New England Deaconess Hospital	Clinical Facility (Patient Care, Treatment Facilities) 330,000 SF	1994
4.	Beth Israel Hospital	Clinical Center (Medical, Retail, Clinical) 385,000 SF 700-710 space garage	1995
		Research North (Research) 110,000 SF	1996

Sources:

1. *Joslin Diabetes Center, Research and Clinic Facility - FPIR*, Ellenzweig Associates, Inc., September 1991.
2. Brigham and Women's Hospital, *Clinical Support Facility - Transportation Access Plan - FPIR*, Vanasse Hangen Brustlin, Inc., July 1991.
3. Beth Israel Hospital, *Clinical Center and Research North, FPIR*, VHB, Inc., November 1992.

of these background "other developments" (i.e., development independent of the Project). The trip generation for the "other developments" was obtained from the data sources cited in Table III-2.1.

2.3 1998 No-Build Traffic Volumes

The combined "other development" trips were distributed throughout the study area roadway network in order to evaluate the 1998 No-Build traffic effects. The vehicle trips from the other developments under construction or approved within the study area were extended as through traffic entering and exiting the major roads near the Site. The inclusion of the 1.0% background growth rate with these "other" development vehicle trips results in the 1998 No-Build traffic volumes. The 1998 AM and PM No-Build traffic volumes are shown on Figures III-2.1 and III-2.2.

2.4 1998 No-Build Traffic Operations

Using the AM/PM traffic volumes, an analysis of peak hour traffic operations for 1998 conditions, without the Project, was conducted. The results of this analysis are presented in Table III-2.2. All LOS calculations are shown in Appendix E of the DPIR/DEIR.

During the morning peak hour, Longwood Avenue at Huntington Avenue remains at LOS F when compared to the 1993 conditions. Delays are, however, increased to over five minutes during the 1998 No-Build conditions. Under the 1998 No-Build conditions, the intersection at Longwood Avenue at Brookline Avenue includes improvements being implemented by the Beth Israel Hospital. The plan calls for a right-turn lane on Longwood Avenue westbound to accommodate traffic turning onto Brookline Avenue. These improvements are expected to be completed in 1995 as part of the Beth Israel Hospital's Clinical Center mitigation plan.

As shown in Table III-2.2, even with the inclusion of the right-turn lane, the Longwood Avenue at Brookline Avenue intersection will remain LOS C with decreased delays during the 1998 No-Build AM condition. At the unsignalized intersections, left turns from Avenue Louis Pasteur onto Longwood Avenue continue at LOS E in the AM. All other unsignalized will operate at LOS C or better.

During the afternoon peak hour, Longwood Avenue at Huntington Avenue continues at LOS F. Longwood Avenue at Brookline Avenue improves to LOS C with decreased delays due to the right-turn lane improvement. At the unsignalized intersections, lefts from Avenue Louis Pasteur continue to operate at LOS F. All other unsignalized intersections will operate at LOS C or better.

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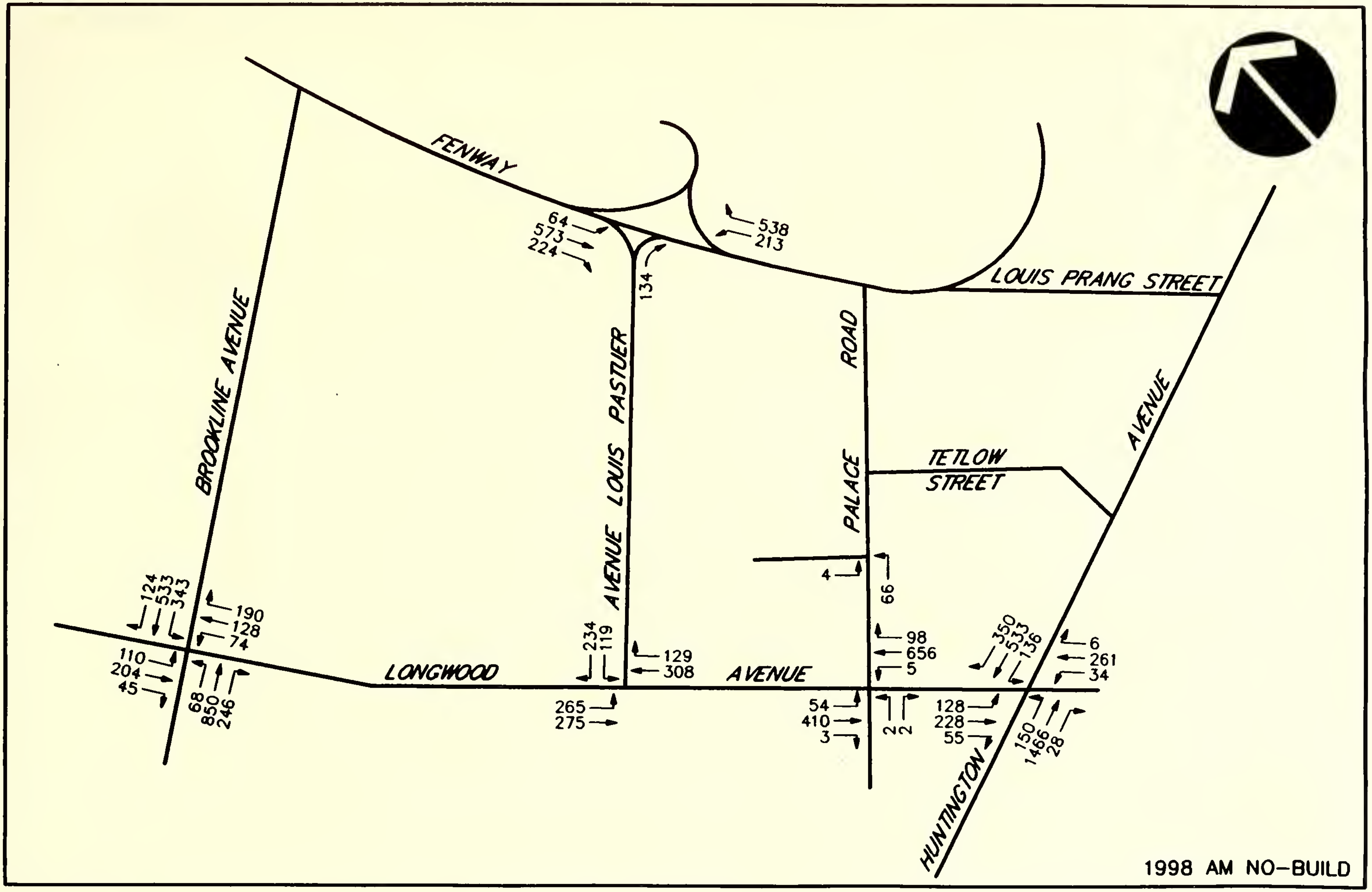

Figure III-2.1
1998 AM No-Build Peak Hour Traffic Volumes
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

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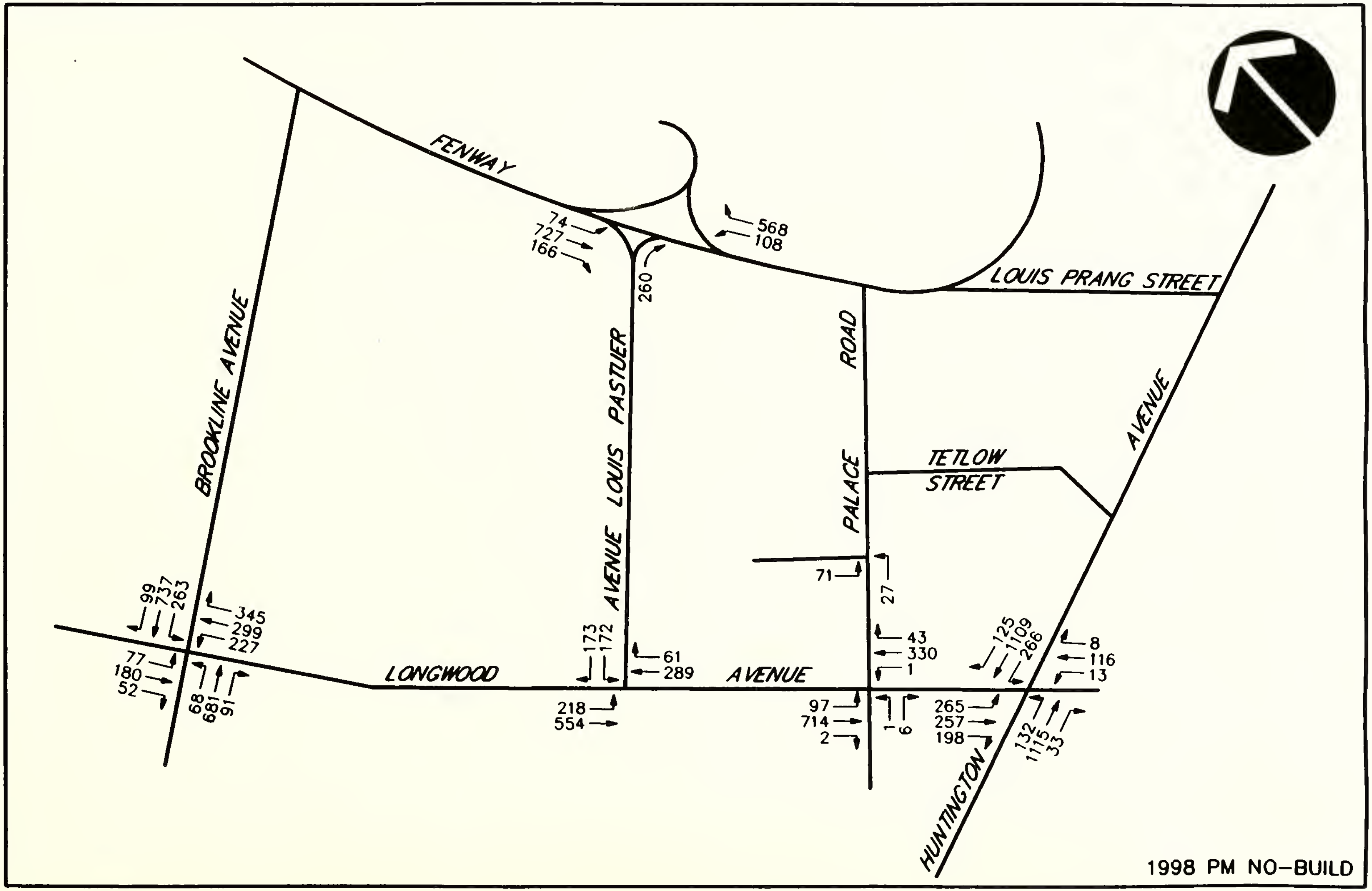

Figure III-2.2
1998 PM No-Build Peak Hour Traffic Volumes
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

Table III-2.2: 1993 Existing and 1998 No-Build Peak Hour Level of Service

Signalized Intersections

		1993 Existing				1998 No-Build			
		AM Peak		PM Peak		AM Peak		PM Peak	
No.	Location	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Longwood Avenue/Huntington Avenue	F	*	F	146.6	F	*	F	*
2	Longwood Avenue/Brookline Avenue	C	24.9	D	25.9	C	20.9	C	23.1

* Delay exceeds three minutes

Unsignalized Intersections

		1993 Existing				1998 No-Build			
		AM Peak		PM Peak		AM Peak		PM Peak	
No.	Location	LOS	RC	LOS	RC	LOS	RC	LOS	RC
3	**Longwood Avenue/Palace Rd./Parking Lot**								
	- Left from Longwood Avenue Eastbound	A	523	A	822	A	484	A	793
	- Left from Longwood Avenue Westbound	A	891	A	634	A	867	A	581
	- All moves from Parking Lot	C	266	A	566	C	230	A	504
4	**Longwood Avenue/Avenue Louis Pasteur**								
	- Left from Longwood Avenue Westbound	A	600	A	764	A	552	A	686
	- Left from Avenue Louis Pasteur	E	79	F	0	E	40	F	-67
	- Right from Avenue Louis Pasteur	A	579	A	659	A	497	A	627
5	**Avenue Louis Pasteur/Fenway Drive**								
	- Left from Fenway Drive Westbound	A	1132	A	1123	A	1128	A	1118
	- Left from Fenway Drive Eastbound	A	433	A	428	B	362	B	398
	- Right from Avenue Louis Pasteur	A	814	A	638	A	787	A	550

3. 1998 BUILD CONDITIONS

3.1 Trip Generation

Vehicle trips to and from a site can be estimated by several means. The standard option (and the one required by MEPA review) is to use data published by the Institute of Transportation Engineers (ITE) in the manual entitled Trip Generation (5th Edition, 1991). This publication contains trip generation rates for a wide variety of land uses. These vehicle trip rates are obtained from nationwide studies and are normally suitable for design purposes.

The Project is, for the most part, a consolidation of the College's uses onto its Campus. The only increase in use will be due to the relocation of the BWH's Channing Laboratory, which will be housed in the new Research Facility, is presently located at the former Angell Memorial Building. The relocation of the Laboratory may result in an increase in trips to the Site, although total Channing Laboratory trips to the LMA would remain the same.

Utilizing ITE Land Use Code 760 (Research Center), the 200 additional research employees can be expected to generate 110 trips during the morning peak hour, 109 during the afternoon peak hour and 776 daily trips (see Table III-1.2). However, these are not new trips since the Channing Laboratory employees already travel to the LMA. In addition to the Research Facility, the Project will have a modest increase in academic use. According to the College, enrollment is expected to increase by only approximately 50 students and 20 faculty and staff over the next five years. Utilizing ITE Code 550 (Universities), an additional 168 daily person trips would be generated by the College expansion, 9 during the morning peak hour, and 15 during the afternoon peak hour, Table III-3.1 displays these results.

Table III-3.1: ITE Trip Generation

Use	AM Peak Hour		PM Peak Hour		Daily
	Enter	Exit	Enter	Exit	
Academic Use	7	2	7	8	168
Research Facility	91	19	16	93	776
	98	21	23	101	944

Although the EOEA/EOTC Guidelines call for the use of ITE trips when analyzing a project, the use of ITE data may not always be appropriate. A review of the ITE report, pages 800-811, indicates that the data source for Land Use Code 550 is very limited. The data was collected in 1973 at one location, a 545 student college in Delaware. Thus, ITE cautions the reader in using it for analysis purposes. Furthermore, the Channing Laboratory trips are not new trips, but are relocated trips from their existing sites within the LMA.

Therefore, a more appropriate analysis is to utilize actual trip rates and modal share information from the College and the Channing Laboratory. To properly quantify the actual vehicular traffic volumes, the average vehicle occupancy rate, as well as transit and pedestrian trips, must be accounted for.

As previously shown in Table III-1.3, the College has found that only 30% of its students arrive by car while 78% of its faculty/staff use their cars (although not all faculty/staff arrive and depart during the AM and PM peak hours, respectively). In addition, only 575 students and 150 faculty and staff are on campus at any one time.

Based on the modal share projected in Table III-1.3, and the anticipated student and faculty increases, College specific uses will generate an additional 46 one-way vehicle trips per day as shown in Table III-3.3.

In order to determine the modal share of the Channing Laboratory employees, BWH conducted its own employee travel survey. According to BWH, as shown in Table III-3.2, 63% of the Channing Laboratory employees commute to work by a mode other than private automobile. Table III-3.3 displays the net trip generation. The laboratory will generate 124 vehicle trips per day for a total of 170 new trips to the Project site.

Table III-3.2: Channing Laboratory Modal Share

MODE	Researchers
Auto	34.0%
Transit	48.0%
MASCO	4.0%
Walk/Bicycle	11.0%
Other	3.0%
TOTAL	100.0%

Table III-3.3: Person-Trip Increase by Mode

AM PEAK HOUR

	College Faculty/Administration*	College Students	Channing Laboratory
Auto	3	6	25
Transit	1	4	41
Walk/Bicycle	1	9	9
MASCO	0	0	4
Other	0	1	5
TOTAL	5	20	84

PM PEAK HOUR

	College Faculty/Administration*	College Students	Channing Laboratory
Auto	2	3	13
Transit	0	3	19
Walk/Bicycle	1	5	4
MASCO	0	0	2
Other	0	1	2
TOTAL	3	12	40

TOTAL DAILY TRIPS

	College Faculty/Administration*	College Students	Channing Laboratory
Auto	16	30	124
Transit	2	22	192
Walk/Bicycle	2	42	44
MASCO	0	0	16
Other	0	6	24
TOTAL	20	100	400

* According to the College's Dean, no more than 10 of the new faculty and staff will be on campus on any given day. These trips represent that assumption.

3.2 Trip Distribution

In order to show the effects of the new trips resulting from the Project on the local street system, vehicle trips are distributed in the directions of origin/destination and assigned to the actual roadways. These assigned volumes, when added to the existing and background traffic, form the input for calculation for all LOS computations.

In 1990, MASCO provided HMM with an employee zip code listing for 23,000 employees working within the LMA. HMM collected a zip code map showing the geographic limits of each zip code boundary from the BRA. The home zip codes, which represent over 400 zip codes within Massachusetts, Rhode Island, New Hampshire, and Maine were assigned the exact employee percentages computed by MASCO. Eight (8) trip origin/destination zones were then placed on a map, and the home base zip code data was shown at each entering point. The directional distributions from these travel zone areas are as follows:

Travel Zones (Inbound)	Vehicle Trip Percentage
From Longwood Avenue (Brookline)	16%
From Brookline Avenue (Brookline)	32%
From Huntington Avenue (Brookline)	4%
From Longwood Avenue (Huntington)	10%
From Brookline Avenue (Boston)	5%
From Huntington Avenue (Boston)	17%
From the Fenway (Boston)	16%
TOTAL	100%

3.3 Trip Assignment

Figures III-3.1 and III-3.2 show the traffic flow maps for the Project generated vehicle trips for the AM and PM peak hours. This analysis in conservative in that it assumes that all new trips have been assigned to the Site.

3.4 1998 Build Traffic Volumes

Figures III-3.3 and III-3.4 show the 1998 Build traffic volumes (1998 background, other developments and Site trips) for the AM and PM peak hours.

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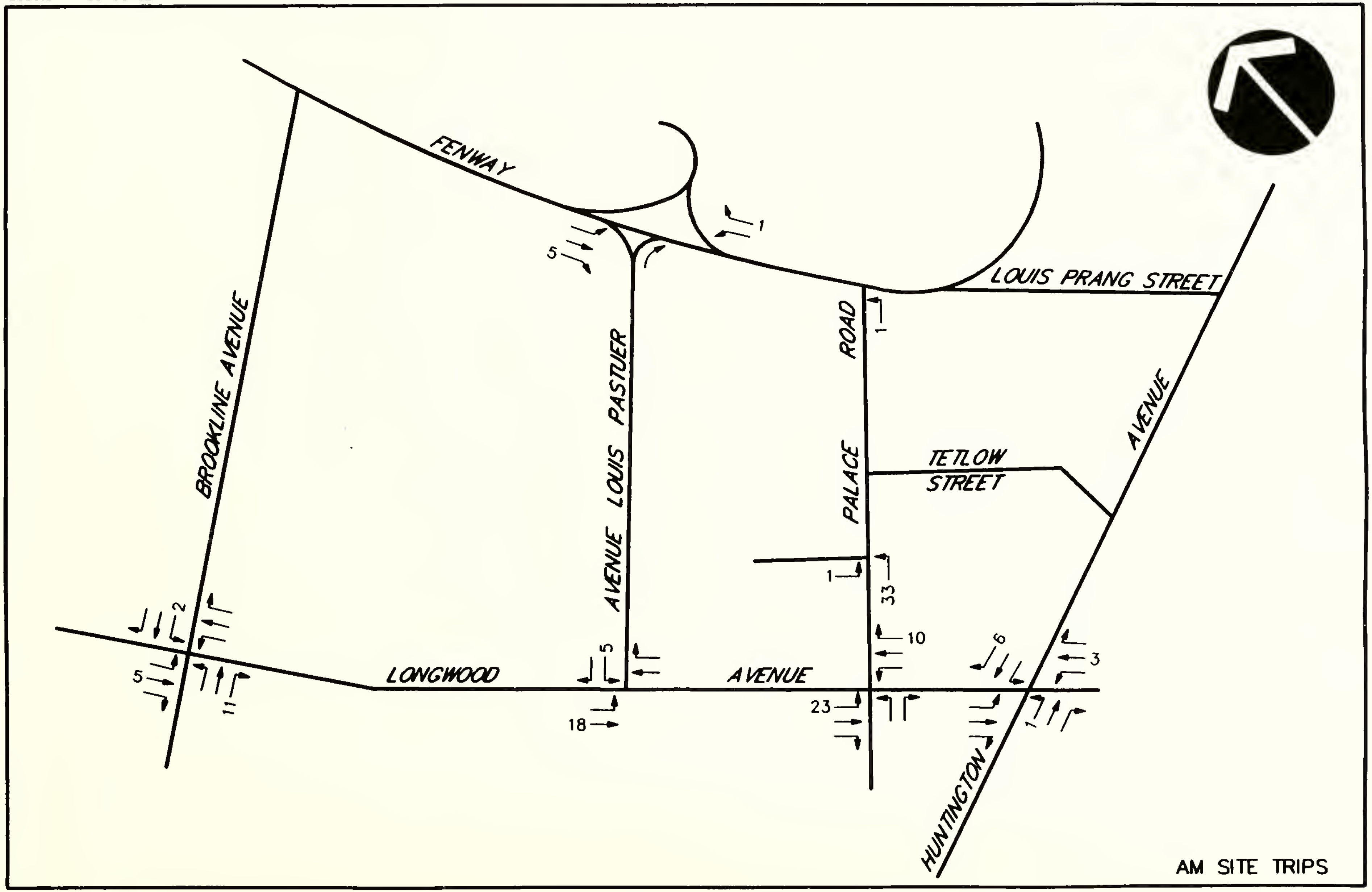

Figure III-3.1
1998 Site Generated AM Peak Hour Volumes
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

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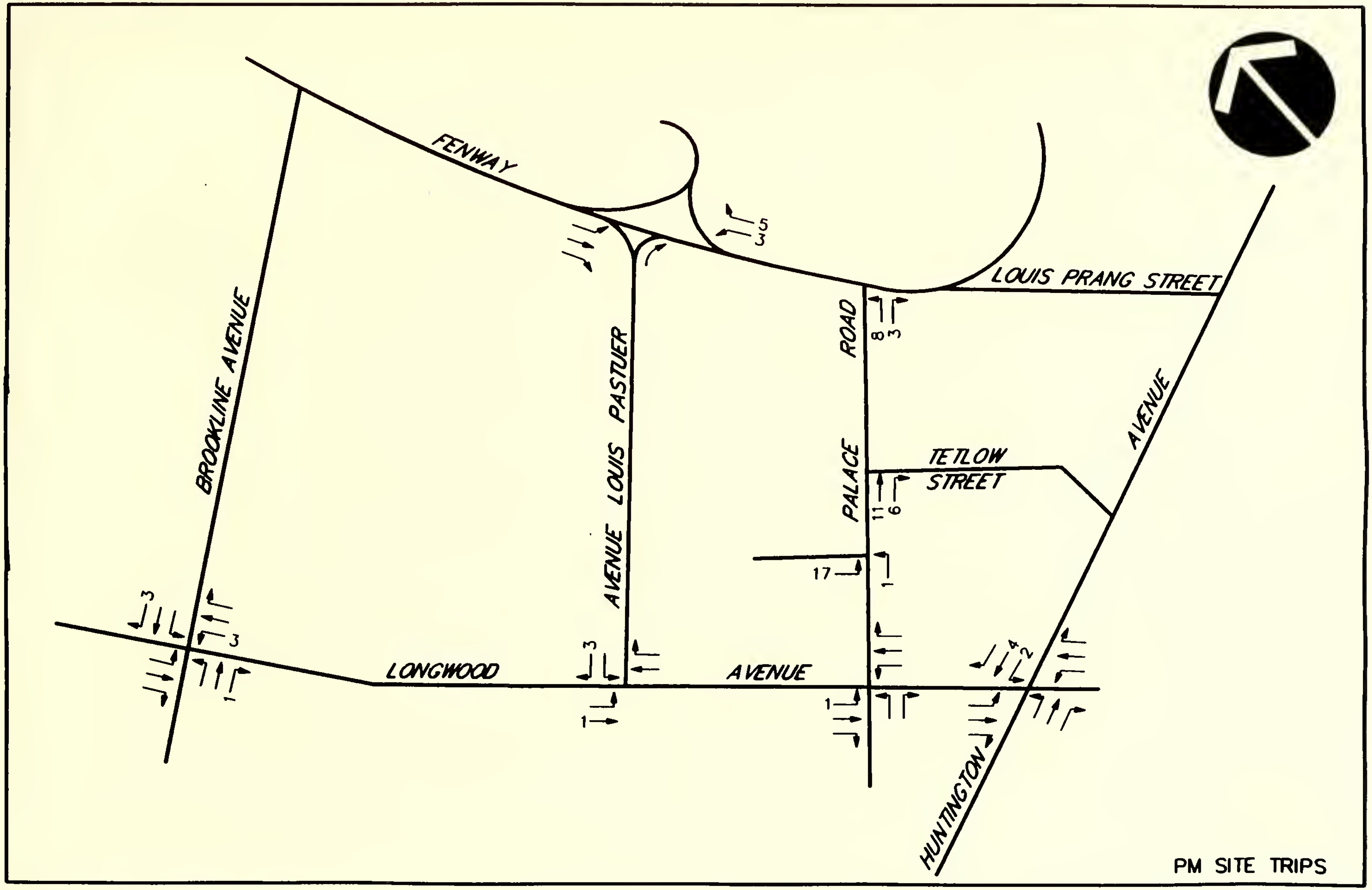

Figure III-3.2
1998 Site Generated PM Peak Hour Volumes
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
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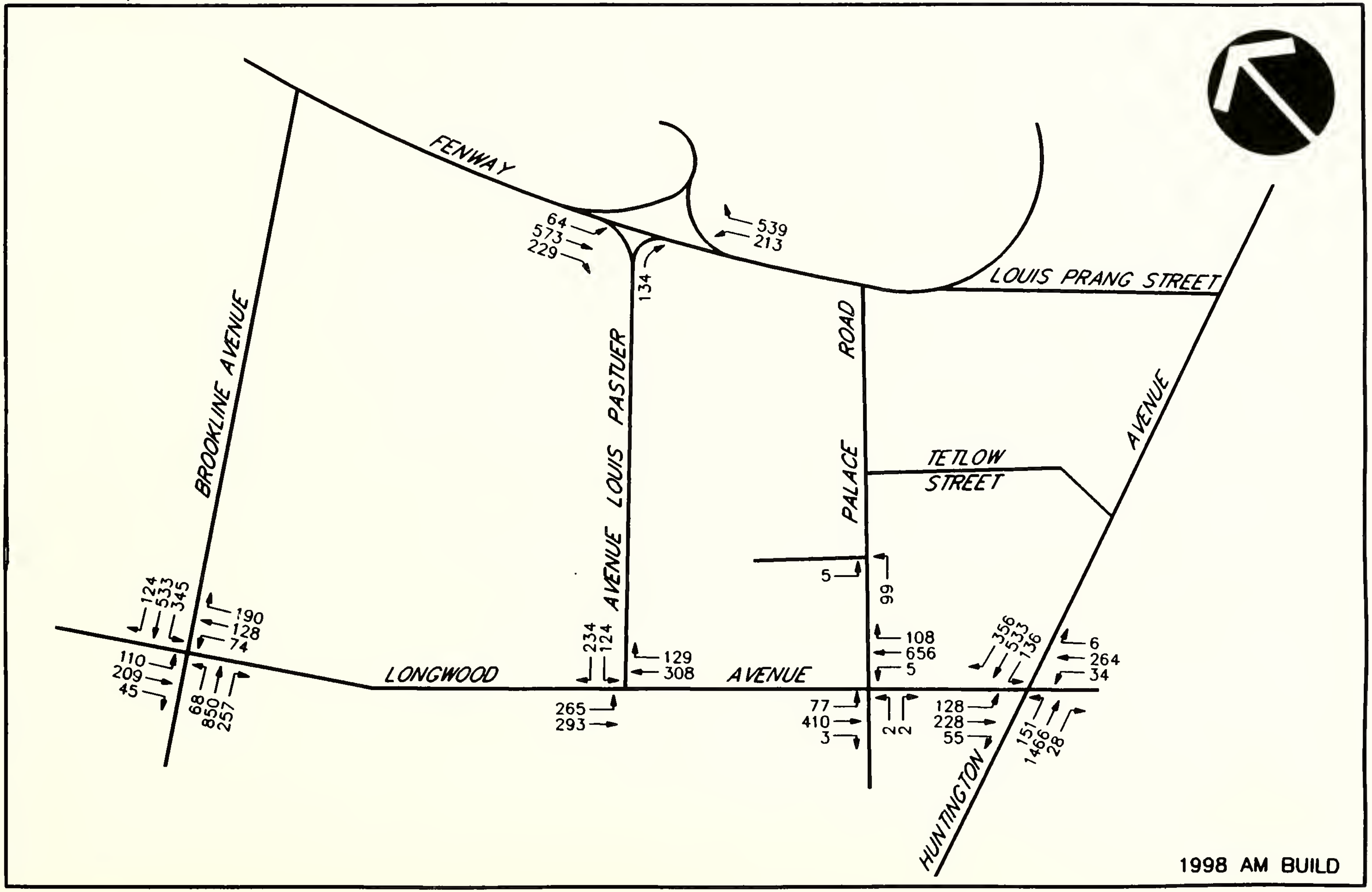

Figure III-3.3
1998 Build AM Peak Hour Volumes
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

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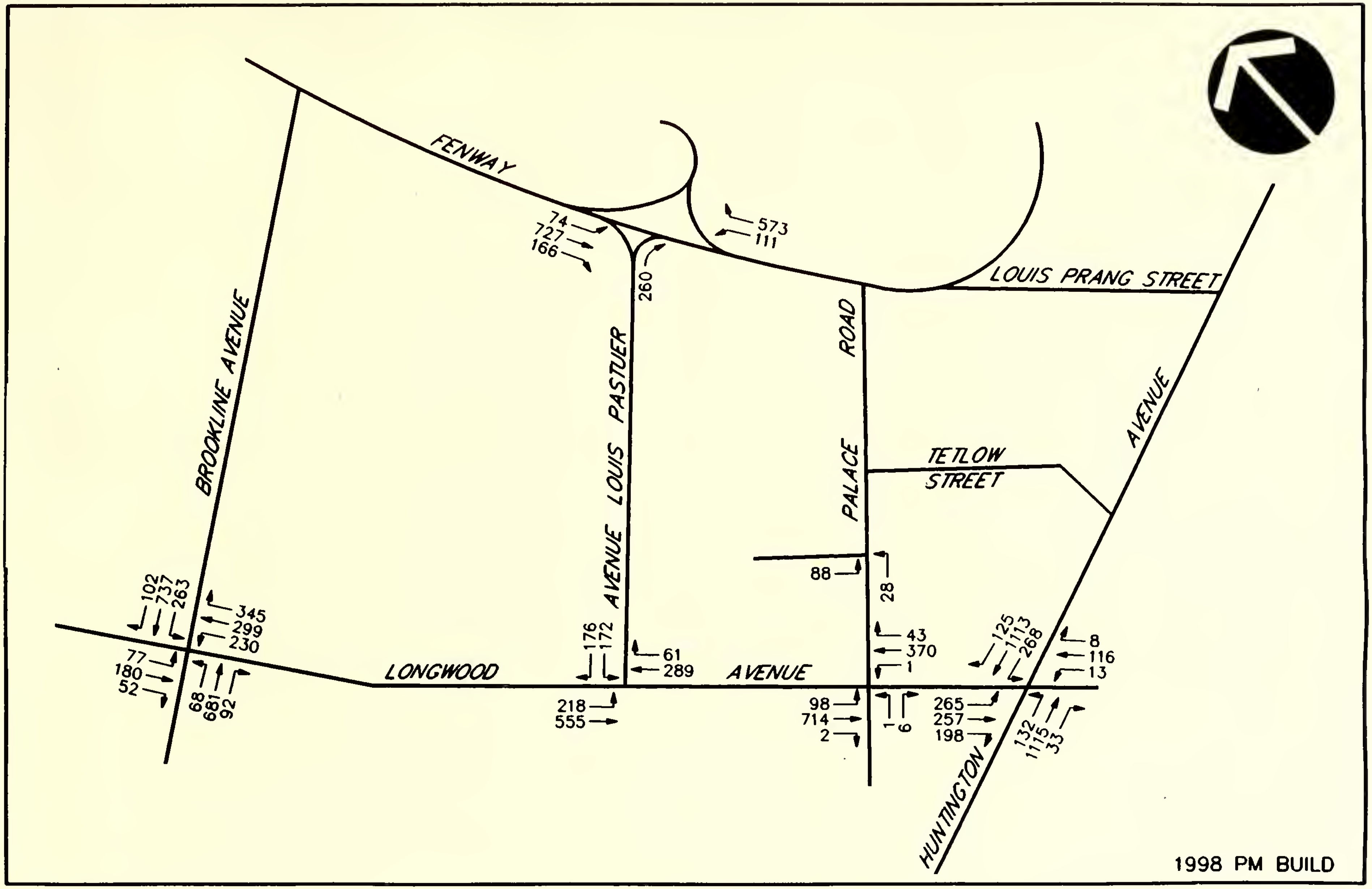

Figure III-3.4
1998 Build PM Peak Hour Volumes
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

3.5 1998 Build Traffic Operations

A comparison of delay times and reserve capacities under the No-Build and Build conditions (Table III-3.4) show the Project has little effect on overall operating conditions at the analyzed intersections. The intersection of Longwood Avenue at Huntington Avenue will remain at LOS F for both peak hours and the left turns onto Longwood Avenue from Avenue Louis Pasteur will remain at LOS E and LOS F for the AM and PM peak hours, respectively, despite the improvements proposed by the Beth Israel Hospital. The remaining intersections will operate at LOS C or better under 1998 Build conditions.

It should be noted that while the Project relocates existing dormitory space and the Channing Laboratory onto the Site, no reduction in background trips has been made. This assumes a continued use of the Channing Laboratory site for medical research/institutional uses, as the future trips are consistent with existing patterns.

3.6 1998 Build Parking Conditions

Table III-3.4 indicates that the Project will result in minimal increases in new trips to the LMA. However, in order to meet this additional, though modest demand generated by the Project, it will be necessary to adopt appropriate mitigation measures, including many of those outlined in Section III-4.0, Transportation Mitigation.

3.7 Transit

As shown in Table III-3.4, the Project will increase transit use by approximately 216 passenger trips per day in 1998. This reflects a modest increase in ridership which should easily be absorbed by the MBTA.

3.8 Pedestrian Effects

As seen in Table III-3.3, the Project will generate an additional 65 pedestrian trips (walk and transit) during the morning peak hour and 32 during the afternoon peak hour. In terms of total pedestrian volumes, these increases are manageable in terms of pedestrian flow during the peak hours. The College profile is different than Boston Latin, which has two distinctive peaks. The College pedestrian flow relates to multiple class periods, and continuous flow with other LMA institutions.

Table III-3.4: 1993 Existing, 1998 No-Build and Build Peak Hour Level of Service

Signalized Intersections

No.	Location	1993 Existing AM Peak LOS	1993 Existing AM Peak Delay	1993 Existing PM Peak LOS	1993 Existing PM Peak Delay	1998 No-Build AM Peak LOS	1998 No-Build AM Peak Delay	1998 No-Build PM Peak LOS	1998 No-Build PM Peak Delay	1998 Build AM Peak LOS	1998 Build AM Peak Delay	1998 Build PM Peak LOS	1998 Build PM Peak Delay
1	Longwood Avenue/Huntington Avenue	F	*	F	146.6	F	*	F	*	F	INF	F	*
2	Longwood Avenue/Brookline Avenue	C	24.9	D	25.9	C	20.9	C	23.1	C	21.4	C	23.1

* Delay exceeds three minutes

Unsignalized Intersections

No.	Location	1993 Existing AM Peak LOS	1993 Existing AM Peak RC	1993 Existing PM Peak LOS	1993 Existing PM Peak RC	1998 No-Build AM Peak LOS	1998 No-Build AM Peak RC	1998 No-Build PM Peak LOS	1998 No-Build PM Peak RC	1998 Build AM Peak LOS	1998 Build AM Peak RC	1998 Build PM Peak LOS	1998 Build PM Peak RC
3	Longwood Avenue/Palace Rd./Parking Lot												
	- Left from Longwood Avenue Eastbound	A	523	A	822	A	484	A	793	A	452	A	792
	- Left from Longwood Avenue Westbound	A	891	A	634	A	867	A	581	A	867	A	581
	- All moves from Parking Lot	C	266	A	566	C	230	A	504	C	209	A	504
4	Longwood Avenue/Avenue Louis Pasteur												
	- Left from Longwood Avenue Westbound	A	600	A	764	A	552	A	686	A	552	A	686
	- Left from Avenue Louis Pasteur	E	79	F	0	E	40	F	-67	E	28	F	-67
	- Right from Avenue Louis Pasteur	A	579	A	659	A	497	A	627	A	497	A	623
5	Avenue Louis Pasteur/Fenway Drive												
	Left from Fenway Drive Westbound	A	1132	A	1123	A	1128	A	1118	A	1128	A	1118
	- Left from Fenway Drive Eastbound	A	433	A	428	B	362	B	398	B	362	B	395
	- Right from Avenue Louis Pasteur	A	814	A	638	A	787	A	550	A	787	A	550

3.9 Construction Management

The College and BTD will negotiate a CMP which will address pertinent construction issues. The construction management plan will include the following measures:

- Secure staging, fencing and bracing will be provided to protect nearby pedestrian traffic.
- Appropriate pedestrian walkways will be covered at nearby construction locations.
- All staging areas with construction materials will be located on private property.
- The removal of construction material and equipment will be staggered over the course of the weekday.
- Designated truck routes for the removal of construction equipment will be clearly defined.
- The work hours of construction will be during the off peak hours of commuter traffic, generally 7:00 AM to 3:30 PM.

4. TRANSPORTATION MITIGATION

4.1 Future Parking Demand/Parking Policy

According to the College's facility planners, the College is projected to employ an additional 20 full-time faculty and staff members by 1998. Using the same employee trip modes as the 1993 projections, the demand for daily parking spaces will increase by 78 vehicles.

It is the stated policy of the College to achieve the following long-term parking goals:

- Reduce total number of available on-campus parking spaces by 26-31 spaces. In addition, 20 of these spaces will be assigned to Channing employees;
- Provide limited access to spaces on the Site to faculty, staff, visitors and some students;
- Reduce single occupancy vehicle use by employees by the implementation of an aggressive Commuter Mobility Plan; and
- Reduce overall College associated parking demand by implementation of several demand management strategies, including working with MASCO to identify additional parking outside the LMA.

To reduce overall employee parking demand, the College will increase the cost of parking, implement a program to maximize vanpool ridership, and adopt policies and management incentives discussed below. By 1998, the College plans to reduce single occupant vehicle use from its current 78% to 30%.

4.2 Roadway Improvements

The College will cooperate with MASCO in its ongoing efforts to improve signal timing and traffic operations along Longwood Avenue and in the LMA. Such improvements could lead to improved LOS conditions at the two signalized intersections. Of particular importance will be efforts to reduce delay at the Longwood Avenue/Huntington Avenue intersection.

4.3 Demand Management Incentives

4.3.1 Educate Employees and Students

The College will educate each employee and student so that all prospective and current users of the Site understand each of the commuter options and its benefits and costs. This process helps inform employees and students about driving alone versus other commuting modes.

- A Commuter Services coordinator will be assigned by the College to provide literature to drivers on mass transit fares, schedules, and routes; ride sharing and MASCO CommuteWorks information; T-pass availability and employee subsidy incentives; and lists of carpools and vanpools looking for riders.

- The College will publicize to new employees/students (and periodically to all employees/students) information on T-passes, MBTA routes and fares, lists of carpools and vanpools looking for riders. This information will be published in the College's orientation materials for new/transfer students, new faculty and staff and in other brochures of wide distribution.

- The College will also cooperate with MASCO's CommuteWorks Program.

4.3.2 Promote Mass Transit

The College will institute a program to allow employees and students to purchase MBTA monthly T-passes. The College will implement a 15% subsidy toward the cost of employee T-passes. The College will discourage employees from driving alone by developing disincentives, such as raising parking rates.

4.3.3 Promote Ridesharing

MASCO's CommuteWorks agency utilizes the Ride Source computer program that enables employees/students to contact other LMA employees/students interested in sharing a ride to/from work. CommuteWorks provides registration cards, monthly computer matching services, and follow-up services to ensure easy transition from driving alone to carpool/vanpool mode. The College will work closely with CommuteWorks to increase ridesharing by employees. The College will set a goal of having 15% of its total employee base utilizing ridesharing, including vanpools.

4.3.4 Alternative Work Hours

The College allows employees to participate in flexible work hours to the maximum degree permitted by the nature of their work and the requirements for control. This option allows employees to select from numerous transit schedule times without being pressured to arrive at a specific time. Flexible work hours encourage employees to form carpools according to their schedules. By adjusting the arrival and departure times of employees, the area-wide vehicle congestion can be substantially reduced during the peak hours.

4.3.5 Student Parking

According to the Modal Share data, approximately 188 students can be expected to drive to school on a daily basis, resulting in a peak demand for 99 spaces, 50 of which are located on campus. Increasing the occupancy rate to 1.15 passengers per car will decrease short term demand by 13 spaces. In addition, illegal parking in the local neighborhood by students will be discouraged.

4.3.6 Encourage Walking/Cycling

Improved lighting and security in the LMA will encourage people to walk to work. A program to educate people on safe and convenient walking routes has been implemented, along with increased protection wherever and whenever feasible. In addition, the College will provide bike racks/cages for faculty and students. The goal is to have 10% of the work force walking and/or bicycling to work by 1998. Forty-two percent (42%) of the student body currently uses this form of transportation.

4.3.7 Parking Fee Structure

The College will initiate a parking fee structure for all spaces on Campus.

4.4 Conclusions

With the above measures in place, the College will experience a significant increase in transit ridership and vehicle occupancy rates. The result (shown in Table III-4.7) is a decrease in parking demand of 80 spaces, leaving a shortfall of 78 spaces, 2 less than the current shortfall. Due to the reduction of parking spaces on-site, from 150 to 119-124 spaces following construction of the Project, there will still be a shortfall. Therefore, the College will continue to reduce demand through it's policy to discourage students from parking in local neighborhoods. Furthermore, the College will continue to work with MASCO in that organization's efforts to identify long-term off-campus parking opportunities outside the LMA.

Table III-4.7: Parking Generation
1993, 1998, 1998 (With Mitigation)

Year	Full-Time Employees	Auto Mode Split	Auto Occupancy	Daily Autos (One-Way)	Daily Turnover Rate (Utilization)	Employee Parking Demand (Long-Term)
1993	150	78%	1.0	117	1.03	114
1998	360[1]	53%[2]	1.0	191	1.03	185
Mit[3] 1998	360	39%	1.15	122	1.03	118

Year	On-Campus Students	Auto Mode Split	Auto Occupancy	Daily Autos (One-Way)	Turnover Rate (Utilization)	Student Parking Demand
1993	575	30%	1.0	173[4]	1.89	92
1998	625	30%	1.0	188	1.89	99
Mit[3] 1998	625	30%	1.15	163	1.89	86

Year	Employee Parking Demand		Student Parking Demand		Total Parking Demand
1993	114	+	92	=	**206**
1998	185	+	99	=	**284**
Mit[3] 1998	118	+	86	=	**204**

---

1 Employees are 160 full-time College and 200 for Channing Laboratories in 1998.

2 Modal Shares = 78% for College and 34% for Channing.

3 Proposed Mitigation includes auto modal share of 45% for College and increased auto occupancy of 1.15 for all users. The College is cooperating with MASCO to implement a trip reduction program. The elements of the program will include employee transit subsidies, implementation of parking fees and a commuter mobility program. In addition, the College will cooperate with MASCO's efforts to identify additional parking outside of the LMA, which will lead to further reductions in the parking demand.

4 Only a portion of theoretical number currently park on-campus.

IV. ENVIRONMENTAL PROTECTION COMPONENT ISSUES

IV. ENVIRONMENTAL PROTECTION COMPONENT

1.0 INTRODUCTION

The BRA's PAD on the DPIR and the Secretary's Certificate on the DEIR concluded that the information and analysis provided in the DPIR/DEIR concerning environmental impacts of the proposed Project were sufficient to satisfy the scoping requirements, except for additional information and technical analyses as noted in this section of the FPIR/FEIR.

Additional technical information is provided on the qualitative assessment of pedestrian level winds; daylight analysis; air quality analysis; and geotechnical analysis. All other DPIR/DEIR environmental evaluations not identified in this paragraph were deemed sufficient to meet the BRA Scoping Determination and the Secretary's Certificate.

All DPIR/DEIR technical analyses contained in the Environmental Protection Component are summarized in this section with new technical responses and other material added as may have been developed since the DPIR/DEIR or as have been requested by the BRA or EOEA. All environmental sections are also presented in Section I-3.0 of the Executive Summary.

2.0 ASSESSMENT OF PEDESTRIAN LEVEL WINDS

2.1 Introduction

A qualitative assessment of pedestrian level winds was initially completed for the College's proposed Project. The complete report is provided in the Project's DPIR/DEIR (Section IV-1.0). The results of that study indicated that:

1) There were no locations around the Project where the BRA's 31 mph effective gust criterion was exceeded. Further, no locations were found in Melbourne's Comfort Category 1, unacceptable and dangerous.

2) Two areas had the potential for being in the low range of Melbourne's Comfort Category 2, uncomfortable for walking. These locations were at the northwest and southeast sides of the Project near the north and east corners, respectively.

3) The area between the Project and Boston Latin School, for northeast and northwest winds, may be as high as Melbourne Comfort Category 3, comfortable for walking, with construction of the Project.

4) All other locations were in Melbourne Comfort Category 3 or better.

Due to the complicated nature of the area, with its mix of low-rise, mid-rise and high-rise buildings, an erosion wind tunnel test was also conducted to resolve questions associated with the results of the qualitative study. That study and the results are summarized below and detailed in Appendix E.

The BRA's PAD and Secretary's Certificate considered the DPIR/DEIR qualitative assessment of pedestrian level winds to be sufficient to satisfy the scoping requirements. The BRA also requested that the FPIR/FEIR should provide more detail on the landscaping mitigation plan (type of vegetation, etc.) and should include a plan indicating the location of the vegetative plantings. This Landscaping Plan is presented in Figure IV-2.8.

2.2 Erosion Test Study Methodology

An erosion technique was used in a wind tunnel test to obtain estimates of the occurrence of pedestrian level winds (PLWs) at 28 stations near the proposed Site for the College's preferred Alternative B design. These locations are shown in Figure IV-2.1. Predicted wind speeds were obtained at each of the 28 locations covering the Site and surrounding area.

The study was performed in the Wright Brothers Facility (WBF) wind tunnel of the Department of Aeronautics and Astronautics at the Massachusetts Institute of Technology. The erosion technique produced semi-quantitative predictions of wind speeds at study locations and was used to insure that no excessively windy places were missed in the qualitative assessment (presented in the DPIR/DEIR). The results provide a way of comparing the relative windiness of each of the 28 stations and, using Melbourne's Comfort Criteria, allow an evaluation of the types of pedestrian activities that most people would perceive as comfortably possible at each location.

The erosion technique provides a means of qualitatively measuring wind speeds in the vicinity of a project and has been extensively used over the last 10 years at WBF. To perform such tests, colored rice-like plastic particles are spread one layer thick over all areas of interest in the model. Two cameras are mounted about one foot apart at the top of the wind tunnel, facing down toward the model. Pictures of the model and erosion particles are then taken within the wind tunnel at successively higher wind speeds* approaching the site. This process is repeated for each of 16 wind directions (NNE, NE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW, and N). From these sets of pictures, it was possible to determine the approximate wind speed at which the particles are swept away from each of the 28 locations evaluated. For example, the windiest places are those at which the particles are swept away at the lowest wind speeds approaching the Site, while locations that are still covered at higher wind speeds are relatively calm locations.

Although the results from the erosion test study have been used to obtain estimates of pedestrian level wind speeds, the primary purpose of the test was to obtain additional qualitative estimates of expected Melbourne Categories, and to determine if Pedestrian Level Winds (PLWs) at any station could be expected to exceed the BRA guideline wind speed.

* Wind speeds are categorized based on the upper level unobstructed flow, known as the "gradient wind", approaching the model.

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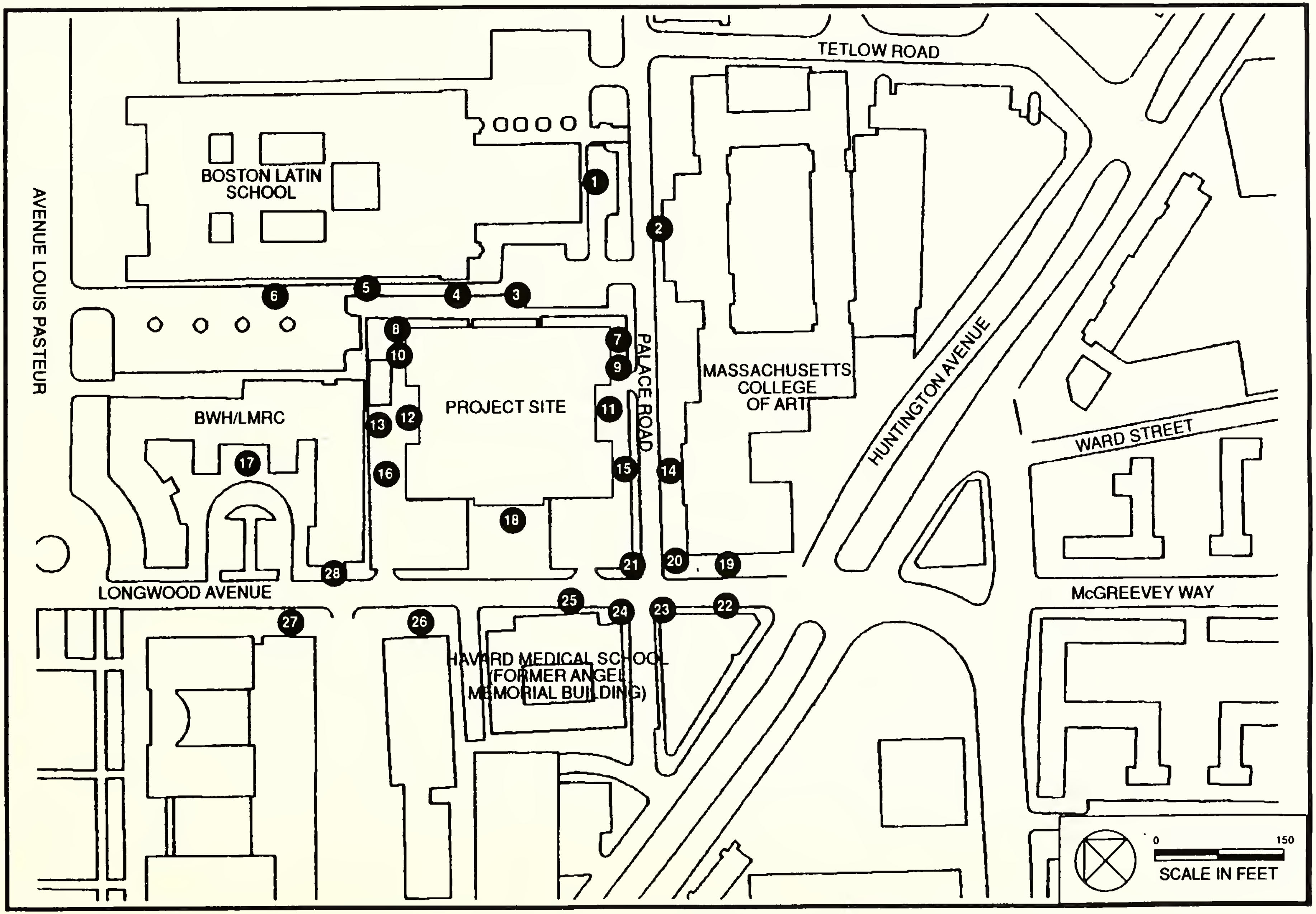


Figure IV-2.1
Erosion Test Study Locations
Massachusetts College of Pharmacy and Allied Health Science

HMM Associates, Inc.

2.3 Comfort Criteria for Pedestrian Level Winds

2.3.1 The BRA Effective Gust Guideline Wind Speed

In order to evaluate the impact of pedestrian level winds, speed criteria or guidelines are necessary. The BRA uses a 100-hour return period effective gust guideline wind speed of 31 mph. The effective gust is defined as the average wind speed plus 1.5 times the rms (root mean square variation about the average) wind speed. This effective gust wind speed is referred to as the BRA guideline wind speed. The 31 mph effective gust roughly corresponds to the fastest 1-minute gust that occurs about once each 100 hours.

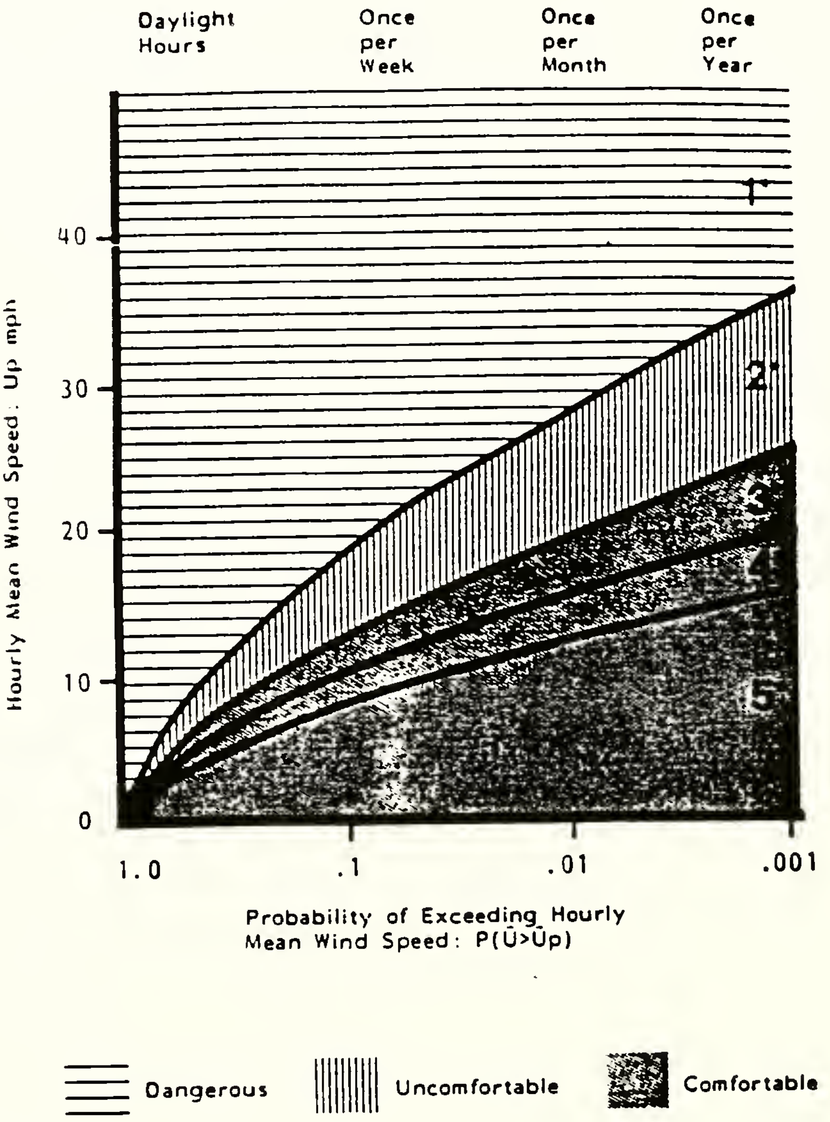
To convert the BRA guideline effective gust wind speed of 31 mph to an equivalent average* wind speed (see Appendix E) as used in this report, the 31 mph must be divided by 1.43, which gives a value of 22 mph. Thus, any predicted 100-hour return period wind speed that exceeds 22 mph also exceeds the BRA guideline wind speed. In this study, no station exceeds the BRA guideline wind speed.

2.3.2 Melbourne's Criteria

The other wind speed criteria used to evaluated pedestrian level winds in this study are those developed by H.W. Melbourne. In 1978, Melbourne conducted a literature review to find a probabilistic criteria for pedestrian level winds that would reflect different types of human activity as well as safety considerations. The results of that study are summarized in Figure IV-2.2. The vertical scale in Figure IV-2.2 is the equivalent average hourly wind speed in mph, and the horizontal scale is the probability of that wind speed occurring based on the number of hours. Five comfort criteria are given. They are:

1) Unacceptable and dangerous;
2) Uncomfortable for walking;
3) Acceptable for walking;
4) Acceptable for short periods of exposure for standing or sitting; and
5) Acceptable for long periods of exposure for standing or sitting.

* The concept of equivalent average wind speed is discussed in Appendix E. It involves a statistical method of relating and determining the worst of the predicted average wind speed at a location and varoius measures of gust velocities. The equivalent average in most cases is closest, in magnitude, to the average predicted wind speed.



* Melbourne's Category

1 Unacceptable and dangerous
2 Uncomfortable for walking
3 Acceptable for walking
4 Acceptable for short periods of standing or sitting
5 Acceptable for long periods of standing or sitting

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Figure IV-2.2
Melbourne's Comfort Criteria
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
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Melbourne's Criteria cover all probabilities. Considering winds with a 100-hour return period (1 percent probability) occurrence, this criteria can be restated in tabular form as shown in Table IV-2.1.

Table IV-2.1 Melbourne's Criteria for 100-Hour Return Period Equivalent Average Wind Speeds

Category	Description	Wind Speed
1	Unacceptable - Dangerous	$U_{eqav} \geq 27$
2	Uncomfortable for Walking	$27 > U_{eqav} \geq 19$
3	Acceptable for Walking	$19 > U_{eqav} \geq 15$
4	Stationary Short Exposure	$15 > U_{eqav} \geq 12$
5	Stationary Long Exposure	$12 > U_{eqav}$

Melbourne's Criteria are subjective and expressed in probabilistic form. They are based on the work of eight authors. The criteria in the table above suggests that if the 100-hour return period equivalent average wind speed exceeds 27 mph, the wind at that location will exceed 27 mph often enough to make that location dangerous. Similarly, if the 100-hour return period wind speed is less than 12 mph, then that location will not seem windy at all, and one can stand or sit comfortably for long periods of time except on very windy days.

An evaluation of wind conditions at an elevation of 4.5 feet at Boston's Logan Airport indicates conditions that are above Melbourne Category 3, acceptable for walking, and slightly below the BRA guideline equivalent average wind speed of 22 mph. This means that wind conditions in the open at Logan Airport would be termed uncomfortable for walking by Melbourne's Criteria, but would be acceptable by the BRA guideline.

2.4 Results

2.4.1 Description of Results

The primary data for the erosion test study consists of the photographs taken during each model run. Overall, there are 224 different photographs, one from each of two cameras showing the effects at each of seven wind speeds for each of 16 wind directions. While all information is contained in these photographs, they must be evaluated carefully in light of Boston wind data to determine predicted pedestrian level wind speeds which can be compared with BRA and Melbourne Comfort Criteria. This process is discussed in detail in Appendix E.

Table IV-2.2 provides estimates of the annual and seasonal 100-hour return period equivalent average wind speeds (i.e., expected to occur about once every 100 hours) and the associated Melbourne Comfort Category for each of the 28 stations considered. The Melbourne Categories at each station are also shown graphically in Figures IV-2.3 through IV-2.7 for the annual period and each season.

Table IV-2.3 gives the percent contribution of each wind direction to the annual wind speed for each station. They are included to enable one to determine the wind directions which contribute the most to the predicted wind occurring. Knowing that northwest winds prevail in the winter, southwest winds prevail in the summer, and easterly winds occur during storms, one can determine if and when any windiness at a station will effect its use.

2.4.2 Discussion of Results

Examination of the results presented in Table IV-2.2 shows that no station has winds that exceed the BRA guideline equivalent average wind speed of 22 mph. Furthermore, only two stations, 8 and 10, have predicted wind speeds that ever fall in Melbourne's Category 2 (in the low end), uncomfortable for walking. Station 8 is in Category 2 annually and in winter, spring, and fall. Station 10 is only in Category 2 in the winter. All other stations fall in Categories 3, 4, and 5.

Table IV-2.4 below lists the number of stations in each Category annually and for each season.

Table IV-2.2 Predicted 100-Hour Return Period Pedestrian Level Winds: Erosion Test Study of the Preferred Alternative B Design

Sta	Equivalent Average Winds					Melbourne Categories				
No.	Annual	Winter	Spring	Summer	Fall	Annual	Winter	Spring	Summer	Fall
1	12	13	13	9	12	4	4	4	5	4
2	13	15	13	10	12	4	3	4	5	4
3	13	14	14	10	13	4	4	4	5	4
4	12	12	13	9	12	4	4	4	5	4
5	10	11	11	8	10	5	5	5	5	5
6	11	11	11	9	11	5	5	5	5	5
7	17	18	18	13	17	3	3	3	4	3
8	19	19	20	14	19	2	2	2	4	2
9	16	17	18	13	17	3	3	3	4	3
10	17	19	18	13	16	3	2	3	4	3
11	11	11	11	8	11	5	5	5	5	5
12	12	13	12	9	11	4	4	4	5	5
13	15	16	15	12	14	3	3	3	4	4
14	13	15	14	10	12	4	3	4	5	4
15	14	15	16	11	14	4	3	3	5	4
16	10	10	11	8	10	5	5	5	5	5
17	11	11	11	9	10	5	5	5	5	5
18	15	15	16	14	15	3	3	3	4	3
19	14	15	15	13	14	4	3	3	4	4
20	16	17	17	14	15	3	3	3	4	3
21	11	12	11	9	10	5	4	5	5	5
22	10	10	11	8	10	5	5	5	5	5
23	14	15	14	11	13	4	3	4	5	4
24	11	12	12	9	11	5	4	4	5	5
25	10	10	10	8	10	5	5	5	5	5
26	11	11	12	8	11	5	5	4	5	5
27	12	13	13	9	12	4	4	4	5	4
28	14	15	15	10	14	4	3	3	4	4

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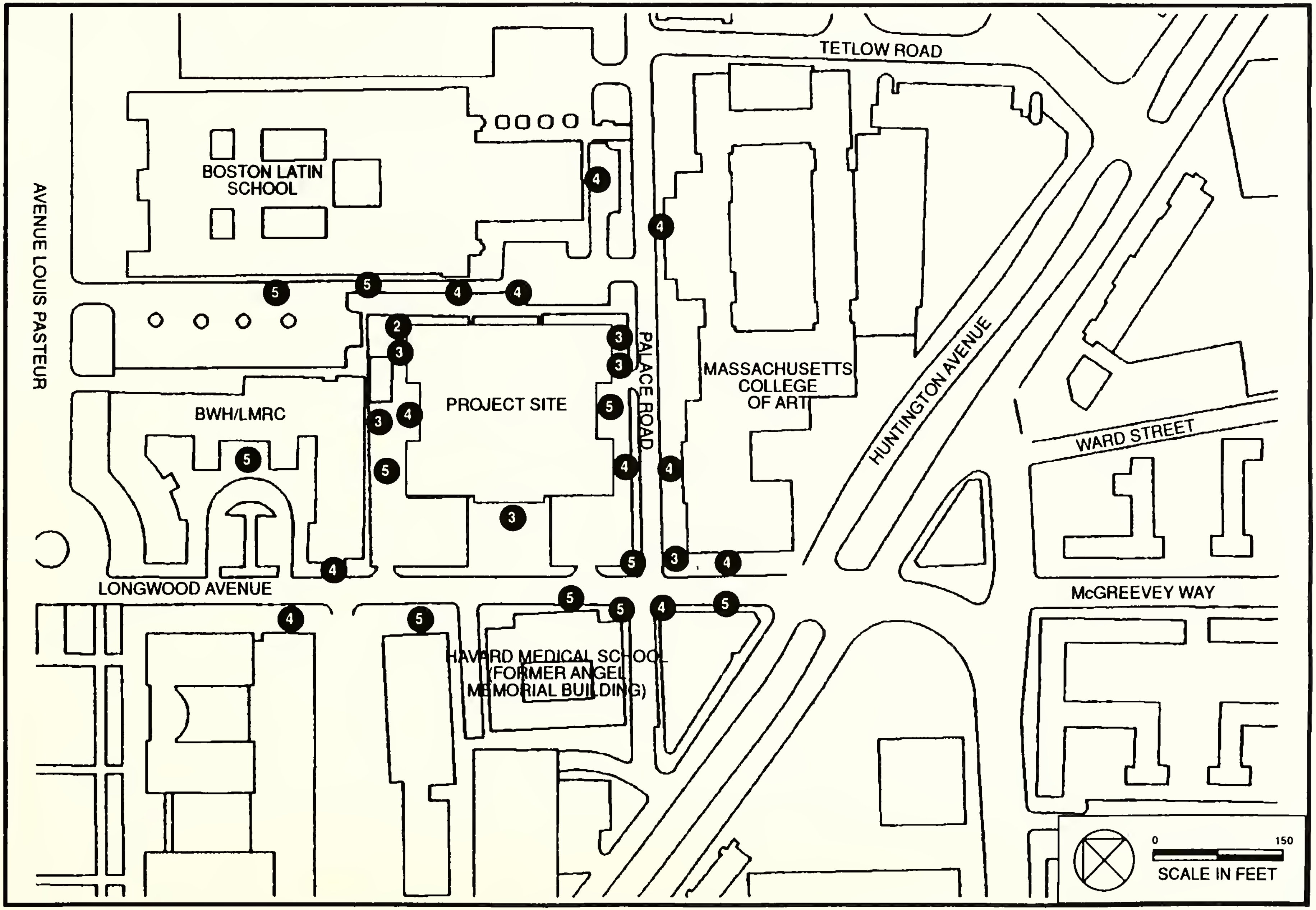

Figure IV-2.3
Melbourne Categories for Annual Build Winds
Massachusetts College of Pharmacy and Allied Health Science

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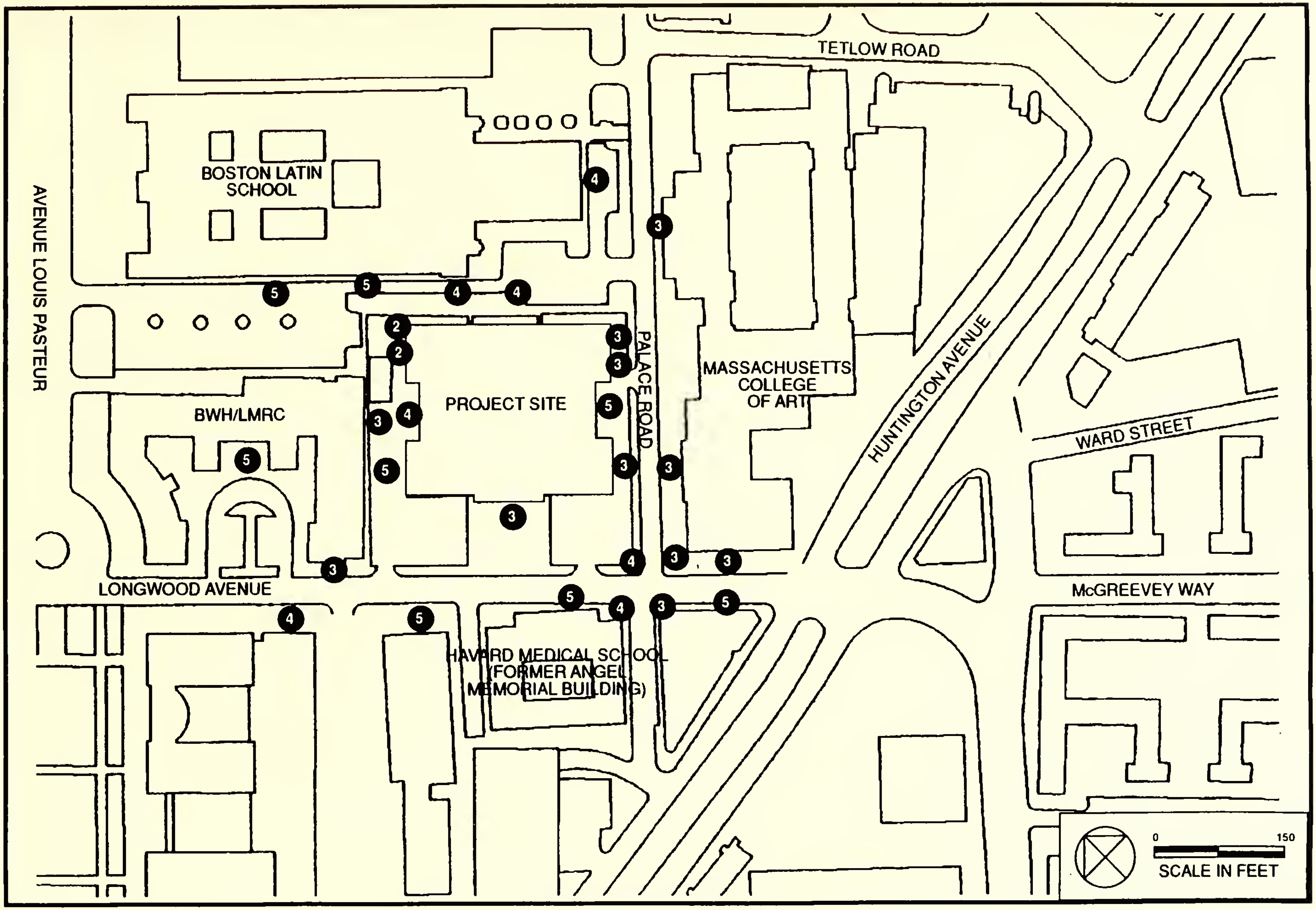

Figure IV-2.4
Melbourne Catigories Winter (NW) Build Winds
Massachusetts College of Pharmacy and Allied Health Science

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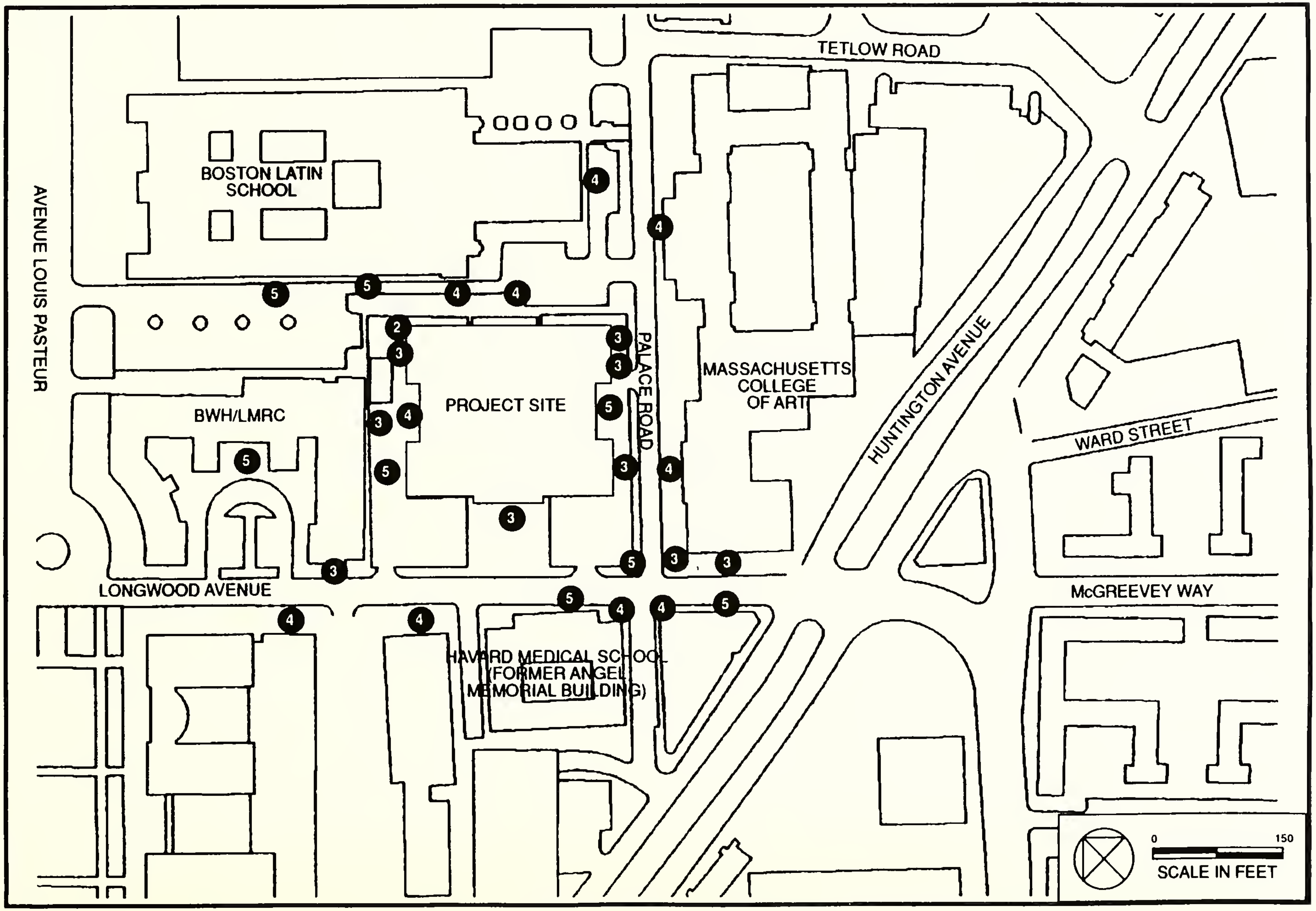

Figure IV-2.5
Melbourne Categories for Spring Build Winds
Massachusetts College of Pharmacy and Allied Health Science

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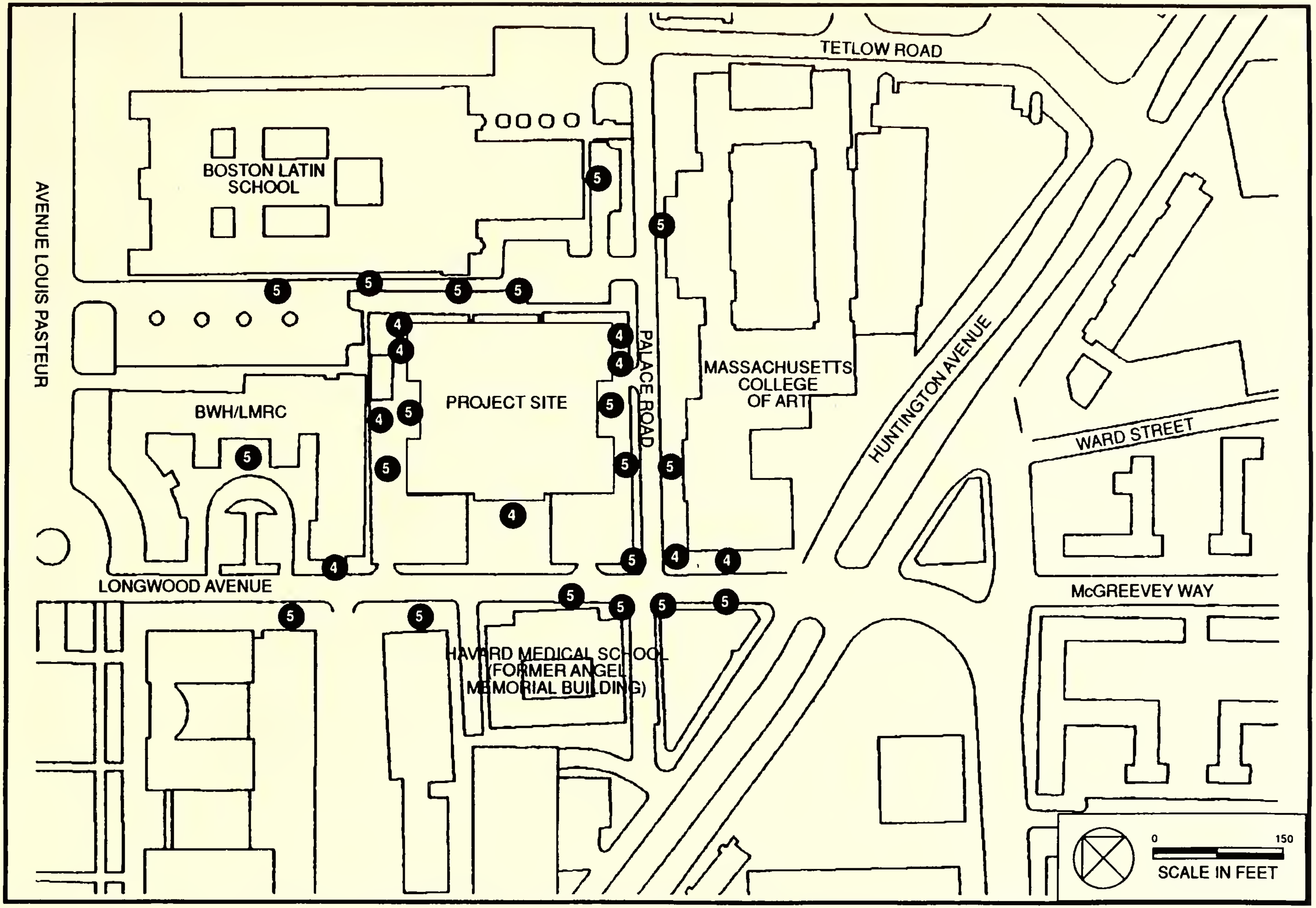

Figure IV-2.6
Melbourne Categories for Summer (SW) Build Winds
Massachusetts College of Pharmacy and Allied Health Science

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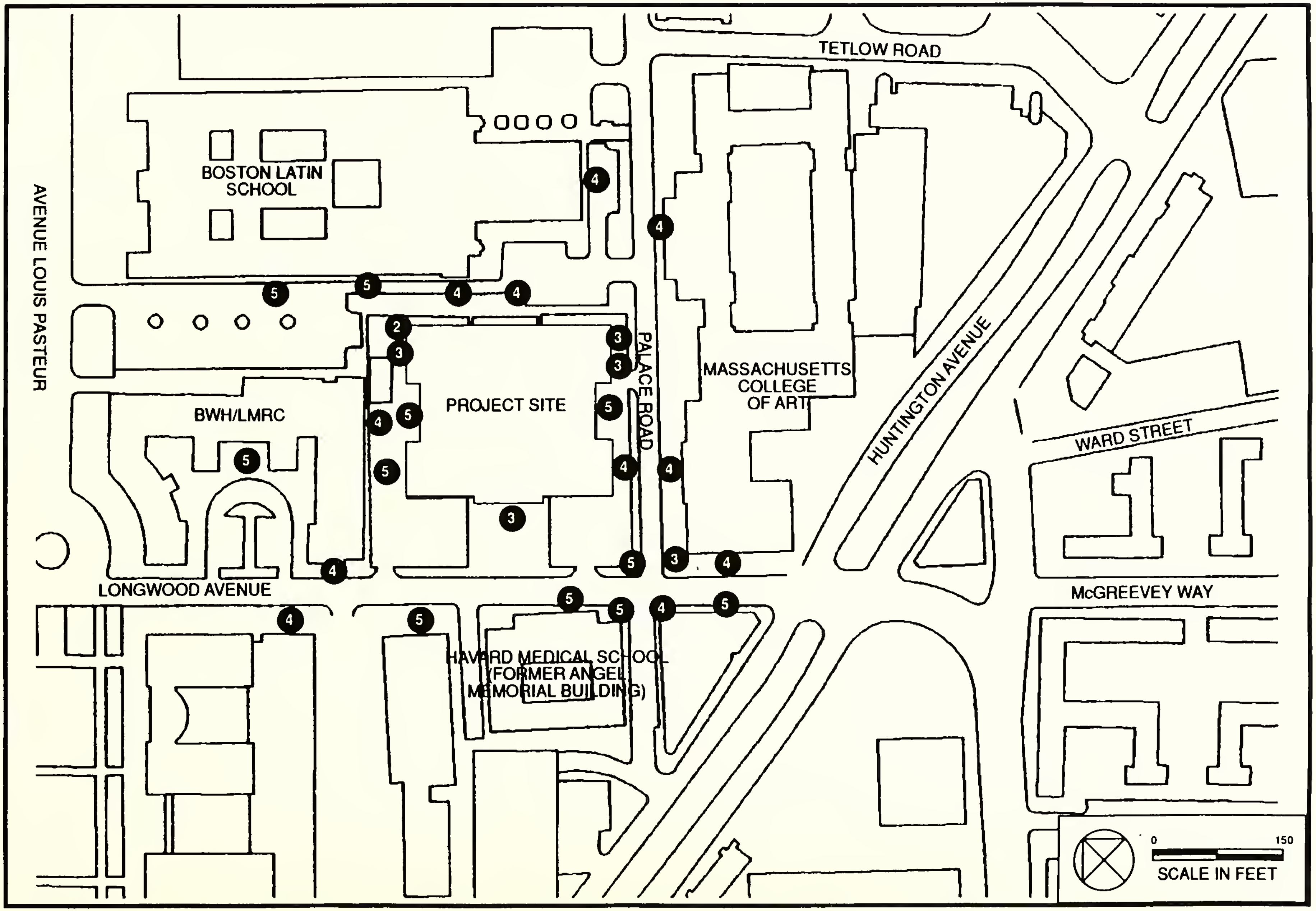

Figure IV-2.7
Melbourne Categories for Fall Build Winds
Massachusetts College of Pharmacy and Allied Health Science

Table IV-2.3 Percent Contribution of Wind Directions to Annual Wind Speeds

STA	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1	0	42	31	21	5	1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	1	47	42	10	0
3	13	29	3	12	0	0	0	0	0	0	0	0	0	0	8	35
4	25	48	8	4	0	0	0	0	0	0	0	0	0	0	1	15
5	12	27	19	11	1	0	0	0	0	9	0	15	0	0	0	5
6	0	20	14	8	0	0	0	0	9	4	36	9	0	0	0	0
7	14	31	22	14	2	0	0	0	0	0	0	0	0	0	9	7
8	9	72	2	8	0	0	0	0	0	0	0	0	1	1	4	3
9	18	37	27	3	3	0	0	0	2	0	0	0	0	0	0	9
10	2	32	4	2	0	0	0	0	2	0	0	0	48	3	0	7
11	9	22	15	41	1	0	0	2	0	6	0	0	0	0	0	4
12	0	11	0	0	0	0	0	0	0	1	0	3	8	76	1	1
13	0	2	1	6	0	0	1	1	6	2	1	0	16	13	32	18
14	0	0	0	0	0	0	0	0	0	0	0	19	43	38	0	0
15	0	21	49	8	13	0	0	0	0	0	0	10	0	0	0	0
16	0	2	23	55	2	0	0	0	0	0	0	0	0	0	10	0
17	0	1	1	0	1	0	0	19	11	5	3	11	26	23	0	0
18	0	0	0	0	0	0	0	0	51	48	2	0	0	0	0	0
19	0	0	0	0	1	0	0	1	9	53	28	8	1	0	0	0
20	O	0	0	0	0	0	1	0	4	27	14	37	9	7	0	0
21	0	1	15	0	1	0	22	1	0	5	0	0	0	0	54	0
22	0	2	20	12	25	0	0	3	17	0	5	0	0	0	8	6
23	1	24	2	10	0	0	0	0	0	7	0	0	30	26	0	0
24	6	57	0	5	0	0	0	0	0	0	0	0	15	13	2	2
25	52	30	1	0	0	0	0	0	0	0	0	0	0	0	9	6
26	9	21	54	0	0	0	0	0	0	0	3	10	0	0	0	3
27	4	0	34	23	0	0	0	0	0	0	0	0	0	0	23	14
28	0	0	2	8	1	0	0	1	11	63	3	10	1	1	0	0

Table IV-2.4: Number of Stations in Each Melbourne Category by Season

Category	Annual	Winter	Spring	Summer	Fall
1	0	0	0	0	0
2	1	2	1	0	1
3	6	11	9	0	5
4	11	7	10	9	11
5	10	8	8	19	11

From Table IV-2.4, one can see that winter will be the most windy season and summer the least.

Stations 7 and 9 are also windy, but somewhat less than stations 8 and 10. Winds at stations 7 and 9 never exceed that of high Category 3. The windiness at these two sets of stations is about the same due to northeast winds, but northwest winds also contribute to the windiness at stations 8 and 10, making them a little windier. Neither of these areas, however, will be subject to any significant pedestrian traffic. The area near stations 8 and 10 would only be used by pedestrians coming from the Boston Latin School parking lot and it is very unlikely any people entering the College would use that lot. Stations 7 and 9 are in the entrance and exit areas for vehicular parking and again one would expect very little pedestrian traffic near either station. The erosion photographs for NNE, NE, and ENE winds indicate the other side of Palace Road is somewhat less windy for those directions.

The west entrance to the New Building is at station 12 and predicted winds there are never worse than Category 4. Note that pedestrians entering this area will come down the alleyway from Longwood Avenue and past station 16 (see Figure IV-2.1) which is in Category 5 for all seasons. The new east entrance is at station 11, which again is always in Category 5. This entrance will probably be approached from Longwood Avenue most of the time. Station 20 at the corner of Massachusetts College of Art Building at the intersection of Palace Road and Longwood Avenue is on the way to that entrance and is predicted to be in Category 3. It appears to be the windiest

spot encountered using that way to the Palace Road entrance. However, the Project probably has little or no effect on the windiness at station 20. The existing entrance that faces Longwood Avenue is at station 18, which is just in Category 3, except in the summer when it is in 4. This is another station where the addition of the Project will have little or no effect on its windiness.

2.5 Mitigation

Results of the erosion test indicate that winds around the New Building will not be in Melbourne's Comfort Category 1 (i.e., unacceptable and dangerous) or exceed the BRA effective gust criterion. Some windiness may be noted around the north and east corners of the New Building. The windiness predicted at the east corner based on the erosion test is somewhat less than earlier predicted during the qualitative assessment (high Category 3, acceptable for walking, as opposed to low Category 2, uncomfortable for walking). To minimize effects at the north and east corners, landscaping will be planted to mitigate winds at these locations. Vegetation has been found to be effective in absorbing wind energy and serving as a wind break for pedestrian areas. The Project will add new vegetation within its property adjacent to Boston Latin School to lessen wind effects on the school. (Note that the erosion test indicates winds between the Project and the Boston Latin School will remain within Melbourne Category 4.) Further, vegetation will be included along Palace Road around the east corner and along the New Building's northwest side, near the north corner, to help serve as a wind break as northeast or northwest winds pass around these points. Also, landscaping is proposed in front of the White Building which may mitigate windiness noted under existing conditions when winds are from the southwest. A landscape plan is provided as Figure IV-2.8.

2.6 Conclusions

An erosion wind tunnel technique was used to obtain estimates of the occurrence of PLWs at 28 stations near the College's Campus.

The results of the study can be summarized as follows:

1) No station considered in the test had annual or seasonal predicted winds that exceeded the BRA guideline wind speed or fell within Melbourne's Comfort Category 1, unacceptable and dangerous.

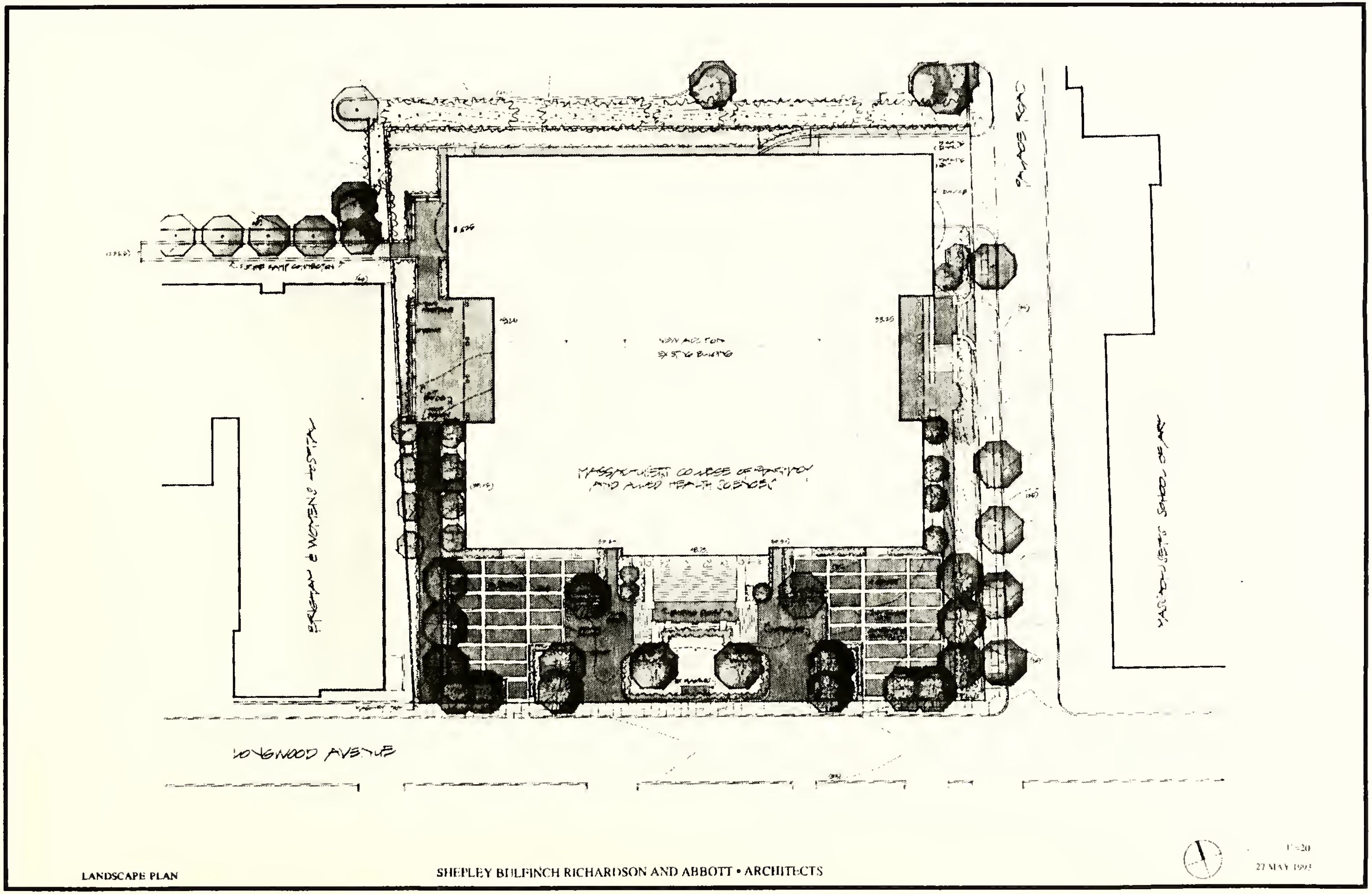

Figure IV-2.8
Landscape Plan
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

2) Only one station (8 at the north corner of the Site) had annual predicted winds that fell into Melbourne's Category 2, uncomfortable for walking. Seasonally, station 8 had predicted PLWs that were in Category 2 for the winter, spring, and fall seasons. Station 10 (next to 8 along the northwest wall of the Site) also had predicted PLWs that fell in Category 2 in the winter. No significant pedestrian traffic, however, is expected near either stations 8 or 10. All other locations are categorized as acceptable for walking or better.

3) Predicted annual PLWs at the existing main entrance to the Site are in Category 3, comfortable for walking. Those at the new east and west entrances are predicted to be Category 5 (comfortable for long periods of standing or sitting) and Category 4 (comfortable for short periods of standing or sitting), respectively. Further, the most likely used pedestrian approaches to both these east and west entrances will have winds comfortable for walking.

4) Winds in the area between the Project and Boston Latin School will be in Category 4 or 5.

3.0 SHADOW

An analysis of existing and new shadows resulting from construction of the Project, was conducted in the DPIR/DEIR for the Vernal Equinox (March 21), the Summer Solstice (June 21), the Autumnal Equinox (September 21), and the Winter Solstice (December 21). For each of these cases, shadow diagrams were prepared for three daytime hours: 9:00 AM, 12:00 Noon, and 3:00 PM (Eastern Standard Time for March and December and Eastern Daylight Time for June and September). These diagrams are also presented in the DPIR/DEIR in Section IV-2.0 as Figures IV-2.2 through IV-2.13 and were mapped using solar altitude angles and bearings specific to Boston.

No additional technical analysis or information was requested by the BRA in the PAD or by the Secretary in her Certificate on the DPIR/DEIR's shadow analysis.

4.0 DAYLIGHT STUDY

4.1 Introduction

A daylight analysis was presented in the DPIR/DEIR. The purpose of the analysis was to estimate the extent to which the Project effects the amount of daylight reaching streets or pedestrian ways in the immediate vicinity of the Site. In accordance with the Scope, this study was limited to buildings on the Site. The study evaluated three viewpoints:

1) From Longwood Avenue, centered on the White Building facade.

2) From Palace Road, centered between the facade of the White Building and the Newton Building.

3) From the walkway adjacent to the Boston Latin School centered on the Newton Building.

For each of these viewpoints, the following configurations were modeled: the existing building configuration, the proposed building configuration and two zoning envelope configurations.

The BRA's PAD and Secretary's Certificate considered the DPIR/DEIR Daylight Study (Section IV-3.0) as adequate, and meeting the requirements of the scopes. The BRA requested consideration be given to increasing setback of the mechanical level from the building facade plane to reduce daylight impact on the Boston Latin School walkway. This request is discussed in Section 4.4 below.

4.2 Methodology

The daylight study was performed utilizing the Boston Redevelopment Authority Daylighting Analysis (BRADA)* computer software. In this method, a view of the Site is taken at ground level from the centerline of the adjacent city streets or pedestrian ways. The facade of the building(s) on the Site facing these viewpoints including heights, setbacks, corners and other features are plotted onto a base map using lateral and elevation angles. The two dimensional base map produced by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen.

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* Harvey Bryan and Susan Stuebing, Boston Redevelopment Authority Daylighting Analysis (BRADA), MIT, Cambridge, MA.

4.3 Results

Table IV-4.1 presents the results of the daylight study. Graphic illustrations of the daylight obstruction from each viewpoint for each configuration are provided in Section IV-3.0 of the DPIR/DEIR.

4.3.1 Existing Configuration

Under the existing building configuration, daylight obstruction values are 20% at the Longwood Avenue viewpoint, 17% at the Palace Road viewpoint, and 31% at the Boston Latin School walkway viewpoint. The largest obstruction value at the Boston Latin School walkway is due to the close proximity of the Newton Building at the edge of the property line of the Site. Another important factor is the location of the viewpoint centered in front of the Newton Building.

4.3.2 Proposed Configuration

Under the proposed configuration, daylight obstruction on Longwood Avenue is unchanged. The proposed configuration behind the White Building does not result in any additional obstruction of the sky dome as viewed from Longwood Avenue. The smaller ratio of the height of the New Building to its distance from the viewpoint as compared to the ratio of the height of the White Building to its distance from the viewpoint result in no change in daylight obstruction. The White Building effectively "hides" the New Building. Daylight obstruction reaches 39% on Palace Road, and 68% at the Boston Latin School walkway under this configuration. The larger building facade of the New Building as compared to the Newton Building as seen from these viewpoints results in the higher daylight obstruction for the proposed configuration.

4.3.3 Zoning Envelope Configurations

With the New Building reconfigured to meet current zoning (Zoning Envelope 1), daylight obstruction is the same as the proposed configuration at Longwood Avenue. At Palace Road daylight obstruction is only 2% less under Zoning Envelope 1 than the proposed configuration. The daylight obstruction percentage is 14% less than the proposed configuration from the the Boston Latin School walkway. From this viewpoint, the zoning setbacks incorporated into Zoning Envelope 1 result in a lower obstruction value than the proposed configuration.

Table IV-4.1: Daylight Obstruction

No.	Viewpoint Location	Configuration	Percent Obstruction
1	Longwood Avenue	Existing	20
		Proposed	20
		Zoning Envelope 1	20
		Zoning Envelope 2	71
2	Palace Road	Existing	17
		Proposed	39
		Zoning Envelope 1	37
		Zoning Envelope 2	68
3	Boston Latin School	Existing	31
		Proposed	68
		Zoning Envelope 1	54
		Zoning Envelope 2	63

For Zoning Envelope 2, with the building facade at its maximum size, the viewpoints from Longwood Avenue and Palace Road have obstruction values of 71% and 68%, respectively, much higher than the other three configurations examined. For the viewpoint from the Boston Latin School walkway, the facade that results from this configuration is different than the proposed configuration in two ways. This configuration is longer than the proposed configuration and incorporates an additional setback. The first factor tends to increase obstruction; the end result are obstruction values for the Zoning Envelope 2 and proposed configuration within 5 percent of each other.

4.4 Conclusions

As previously described, the daylight study was conducted to estimate the effect of the New Building on the amount of daylight reaching adjacent roadways/pedestrian ways. The results show that theoretically, zoning would allow daylight obstruction values much higher than existing or proposed levels from the viewpoints of Longwood Avenue and Palace Road. Therefore, the Project design with the taller component to the rear minimizes the overall percentage of daylight obstructed.

In addition, reconfiguring the New Building itself to meet current zoning standards would have little effect on daylight obstruction. There would be no change at Longwood Avenue, a change of 2% at Palace Road, and a change of up to 14% at the Boston Latin School walkway.

The BRA's PAD reported "that the Project, as proposed, is not significantly worse than as-of-right zoning envelopes would allow."

A review of the setback of the mechanical level from the building facade plane was requested in the BRA's PAD to reduce impacts on the Boston Latin School walkway. According to the architect, the mechanical level is currently setback from the cornice of the New Building approximately seven (7) feet. Due to the size of the required mechanical equipment and the space required by this equipment, further setback of the mechanical level from the building facade plane is not possible.

Further analysis of the New Building suggests that the mechanical rooftop level is only slightly visible in its currently proposed position from the Boston Latin School's sidewalk. Further setback of the mechanical rooftop level would likely lead to little or no improvement on daylight obstruction at the Boston Latin School sidewalk.

5.0 AIR QUALITY ANALYSIS

5.1 Introduction

An analysis was conducted in the DPIR/DEIR (Section IV-4.0) to evaluate air quality effects of the Project. A microscale analysis was performed to determine carbon monoxide (CO) emissions from Project related traffic and ambient concentrations at sensitive receptor locations in the Project area. Results of this analysis indicate that the Project will maintain air quality standards.

The BRA's PAD and Secretary's Certificate considered the Air Quality Analysis as sufficient to satisfy the scoping requirements. The BRA requested that a plan indicating the locations of the garage vents and receptor locations for the garage exhaust analysis should be provided in the FPIR/FEIR. This plan is contained in Figure IV-5.4.

The BRA's PAD also requested that the FPIR/FEIR should identify State Regulatory requirements for the space heating and steam facilities (boilers), as well as measures that will be utilized to obtain DEP approval and minimize the emission of NO_X to the maximum extent feasible. Please see Section 5.3 for discussion of additional responses related to the College's proposed boilers.

5.2 Microscale Analysis

The microscale analysis was conducted to evaluate the effect of Project area traffic on ambient CO concentrations, both with and without construction of the Project. Since CO emissions from motor vehicles are greatest during the idling, and acceleration and deceleration operating modes, CO levels are typically evaluated in close proximity to Project area intersections operating at the poorest level-of-service (LOS). The study points at which CO concentrations are calculated are referred to as sensitive receptors.

National Ambient Air Quality Standards (NAAQS) have been established for CO to protect the public health (known as primary standards). These standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period and 9 ppm for an eight-hour averaging period, more than once per year at any location.

The objective of the microscale analysis is to show compliance with National Ambient Air Quality Standards established for CO with construction of the Project. This involves a demonstration that the Project will not cause an exceedance of a standard at locations attaining standards, as well as demonstration that the Project will not degrade air quality levels at locations

where existing air quality exceeds CO standards, if any such locations were predicted to occur.

5.2.1 Intersections/Sensitive Receptors Modeled

Intersections for the microscale analysis were selected in consultation with the BRA[1] and Massachusetts DEP, Division of Air Quality Control.[2] The following intersections were evaluated:

- Huntington Avenue/Longwood Avenue
- Brookline Avenue/Longwood Avenue

Both of these intersections are signalized. For the Huntington/Longwood intersection, the AM peak hour was modeled, while the PM peak hour was evaluated for the Brookline/Longwood intersection. These periods were selected since the greatest delays occur at these times.

Sensitive receptors were located around each of these intersections to evaluate CO levels. Consistent with EPA Guidelines, these were situated where maximum ambient CO concentrations are likely to occur (i.e., near intersection vehicle queues) and where the general public is likely to have access. Figures IV-5.1 through IV-5.3 show sensitive receptor locations in relation to modeled intersection geometry.

5.2.2 Modeling Approach

CO concentrations were predicted at sensitive receptor locations for both existing and future conditions for the peak one- and eight-hour periods. The cases evaluated included the existing (1993) and future year (1998) no-build and build cases.

For each case modeled, the EPA MOBILE4.1[3], MOBILE5[4] and CAL3QHC[5] computer programs were used to calculate motor vehicle emissions and CO concentrations at sensitive receptors. Emissions data, using MOBILE4.1 to calculate idle mode factors and MOBILE5 to calculate free flow factors, are

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1 Personal Communications, Mr. Richard Mertens, BRA, March 22 and 26, 1993.

2 Personal Communications, Mr. Keith Grillo, Massachusetts DEP, Division of Air Quality Control, March 22, 1993 and April 5, 1993.

3 EPA, User's Guide to MOBILE4.1 (Mobile Source Emissions Factor Model), EPA-AA-TEB-91-01 (Program Revisions November 4, 1991).

4 EPA, User's Guide to MOBILE5 (Mobile Source Emissions Factor Model).

5 EPA, User's Guide to CAL3QHC, Version 2.0 (Draft), EPA-454/R-92-006, October, 1992.

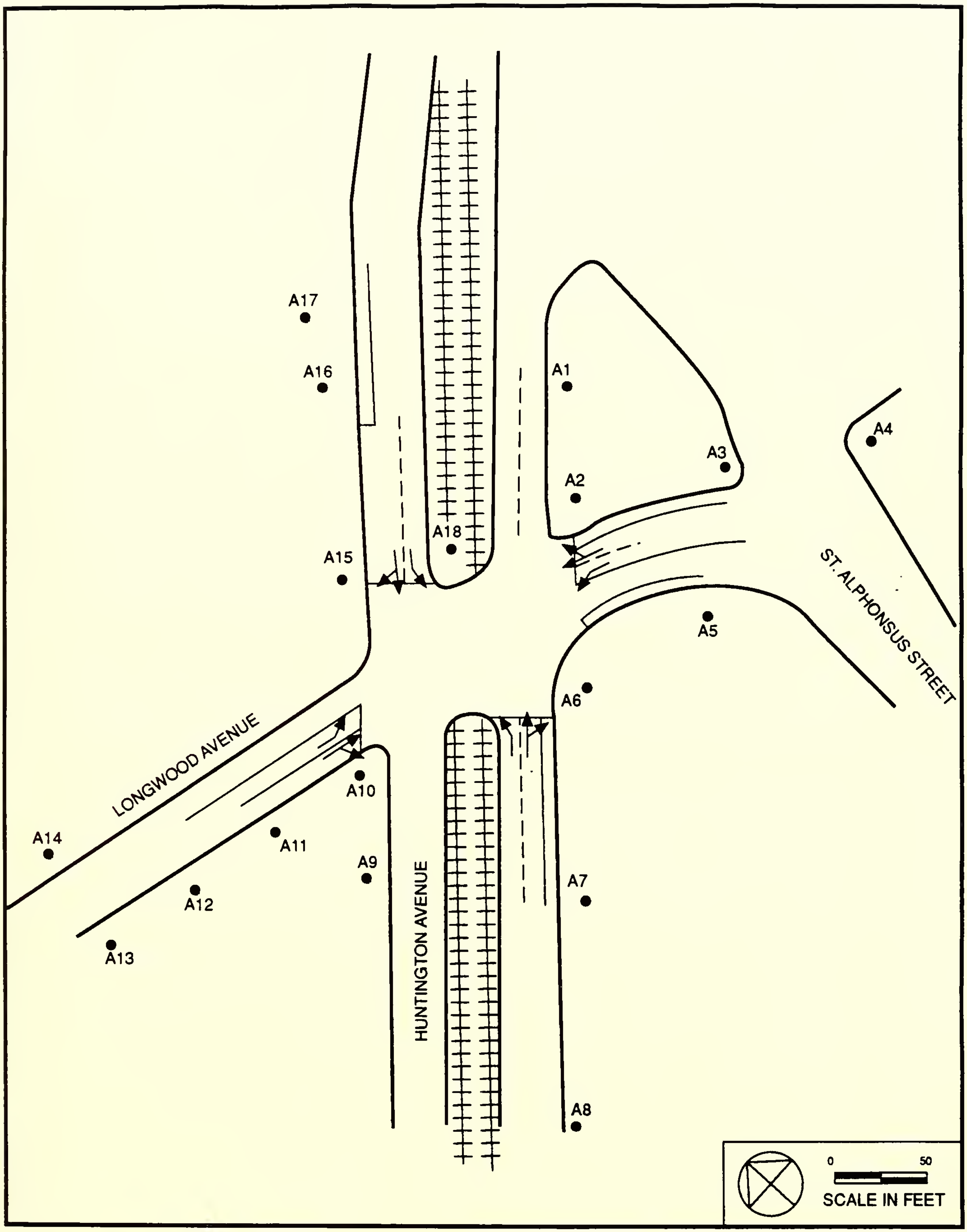

Figure IV-5.1
Intersection of Huntington Avenue/Longwood Avenue
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

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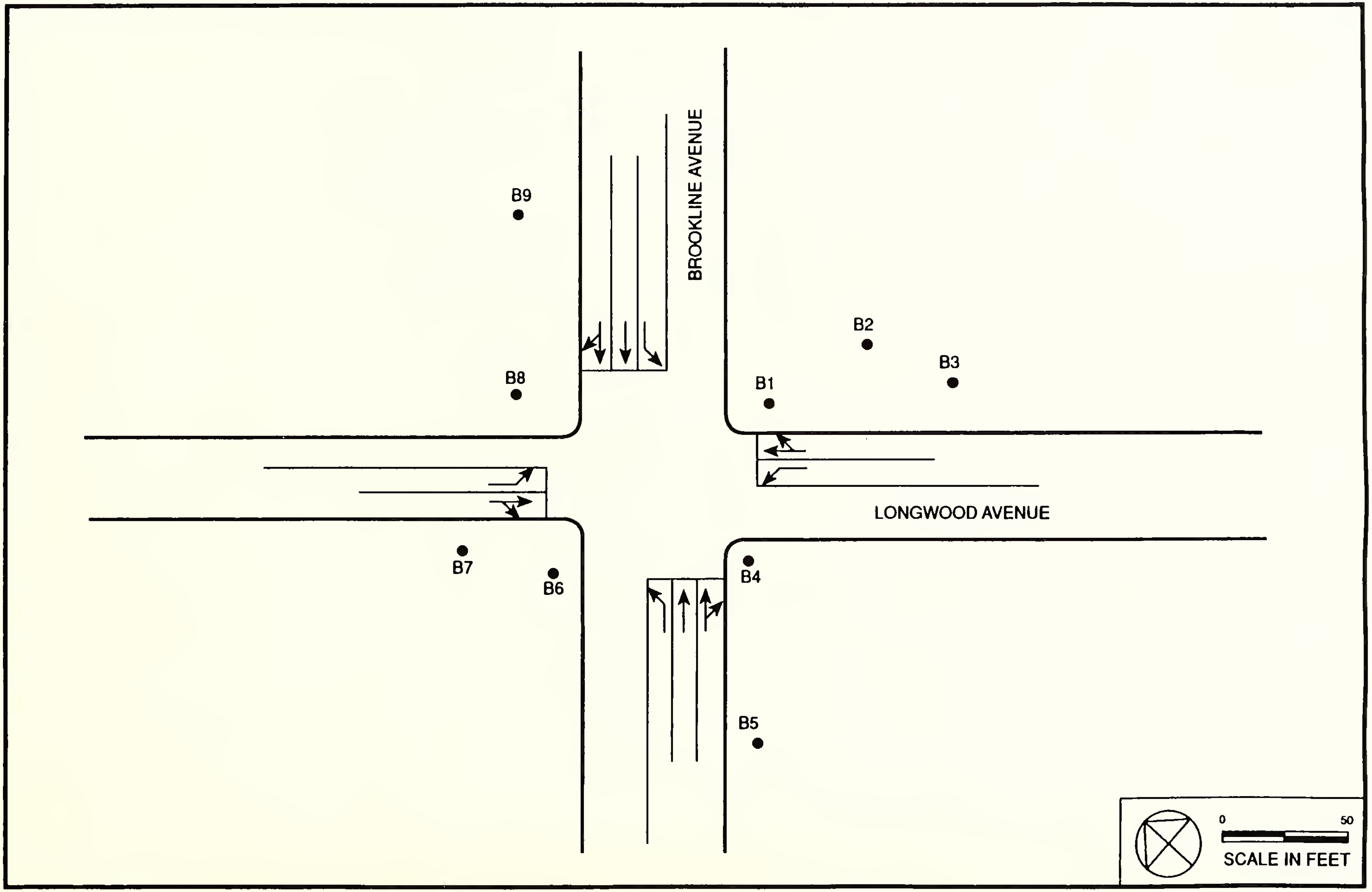

Figure IV-5.2
Intersection of Brookline Avenue/Longwood Avenue
(Existing)
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

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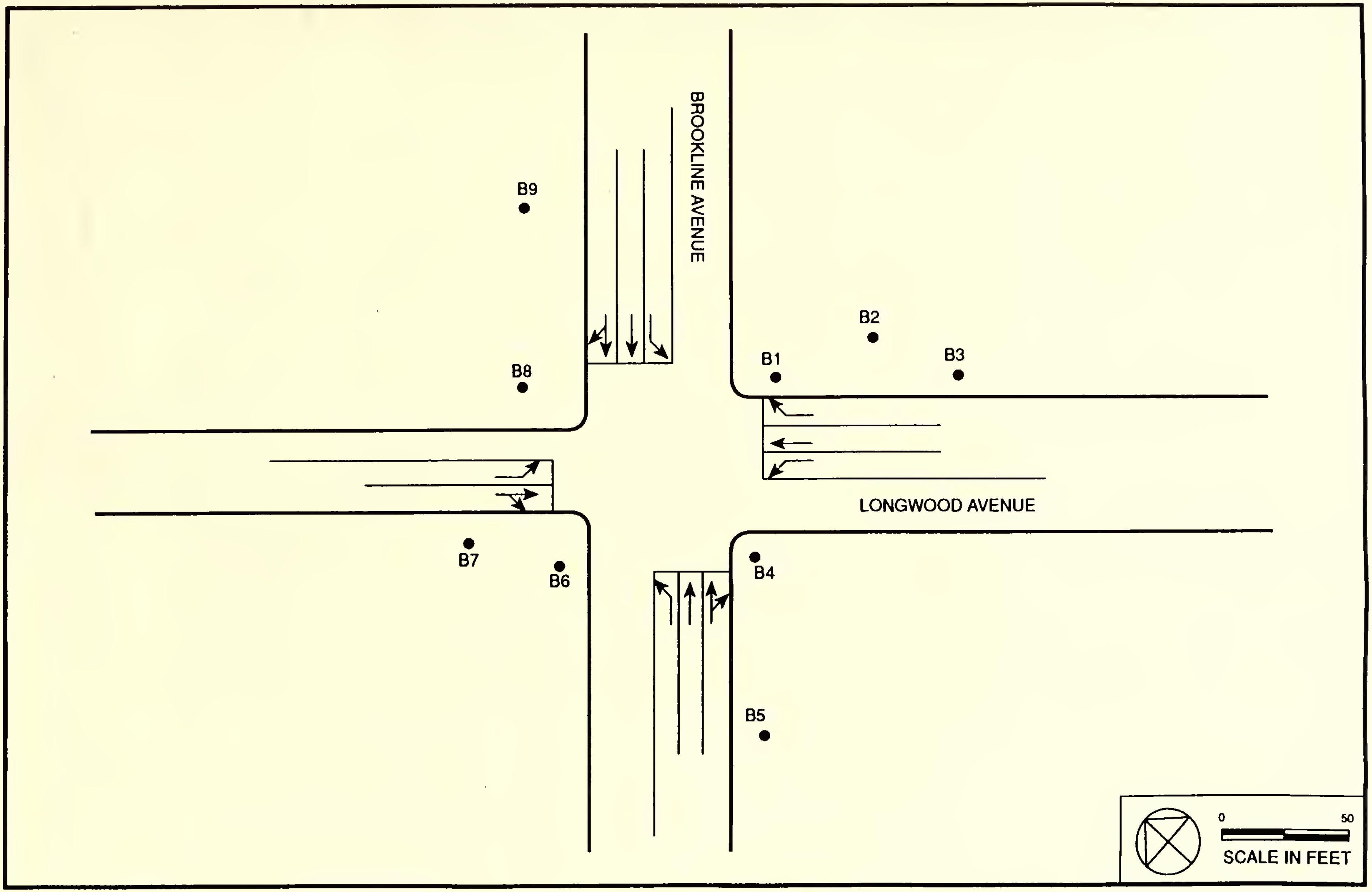

Figure IV-5.3
Intersection of Brookline Avenue/Longwood Avenue
(Proposed)
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

based on motor vehicle operations typical of the peak one-hour and eight-hour periods.

CAL3QHC is an atmospheric dispersion model which uses MOBILE4.1 and MOBILE5 emissions data as input to evaluate ambient concentrations of CO. The model is a mathematical formulation that simulates the transport and diffusion of motor vehicle emissions (i.e., MOBILE4.1 and MOBILE5 results) and then calculates CO concentrations at specified locations (sensitive receptors) around an intersection.

Peak one-hour traffic volumes and turning movements based on the transportation component of this report were used in this analysis. These data were used to assess one-hour CO concentrations. For the eight-hour averaging period, an eight-hour to one-hour factor of 0.9 was selected for the microscale analysis. This factor is consistent with the recent study conducted for the Beth Israel Hospital Clinical Center Project.[1]

Air quality effects associated with the Project's proposed underground parking facility were also considered in the study. Emissions from the garage ventilation system will occur at the north corner of the New Building about 16 feet above ground level. Fresh air intake for the garage is from the Palace Road side of the New Building just above grade. Using EPA MOBILE5 computer model emissions for vehicles in the garage and ventilation system characteristics, CO concentrations in the exhaust vents were calculated. Once released into the atmosphere, Halitsky's gas diffusion equation was used to determine downwind CO concentrations. These results were then combined with intersection effects at the sensitive receptors around the Huntington/Longwood intersection. In addition, a receptor was located at the closest point, from the garage vent, to the Boston Latin School and Palace Road. These receptors and the garage exhaust vent location are shown in Figure IV-5.4. (Garage emissions were not evaluated at the Brookline/ Longwood intersection because of its distance from the garage vent; at this distance, no effect would be predicted.) The effect of on-site parking facilities were also evaluated for the existing and future no-build cases.

An air quality analysis also requires an estimate of "background" air quality levels, representing the contribution of all sources in the project area less the specific intersections analyzed and the proposed garage. Based on DEP comments, default background levels of 5.0 ppm for the peak one-hour and 3.0 ppm for the peak eight-hour were used for 1993. These values were scaled for

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1 *The Clinical Center and Research North FPIR*, Beth Israel Hospital, Boston, November, 1992.

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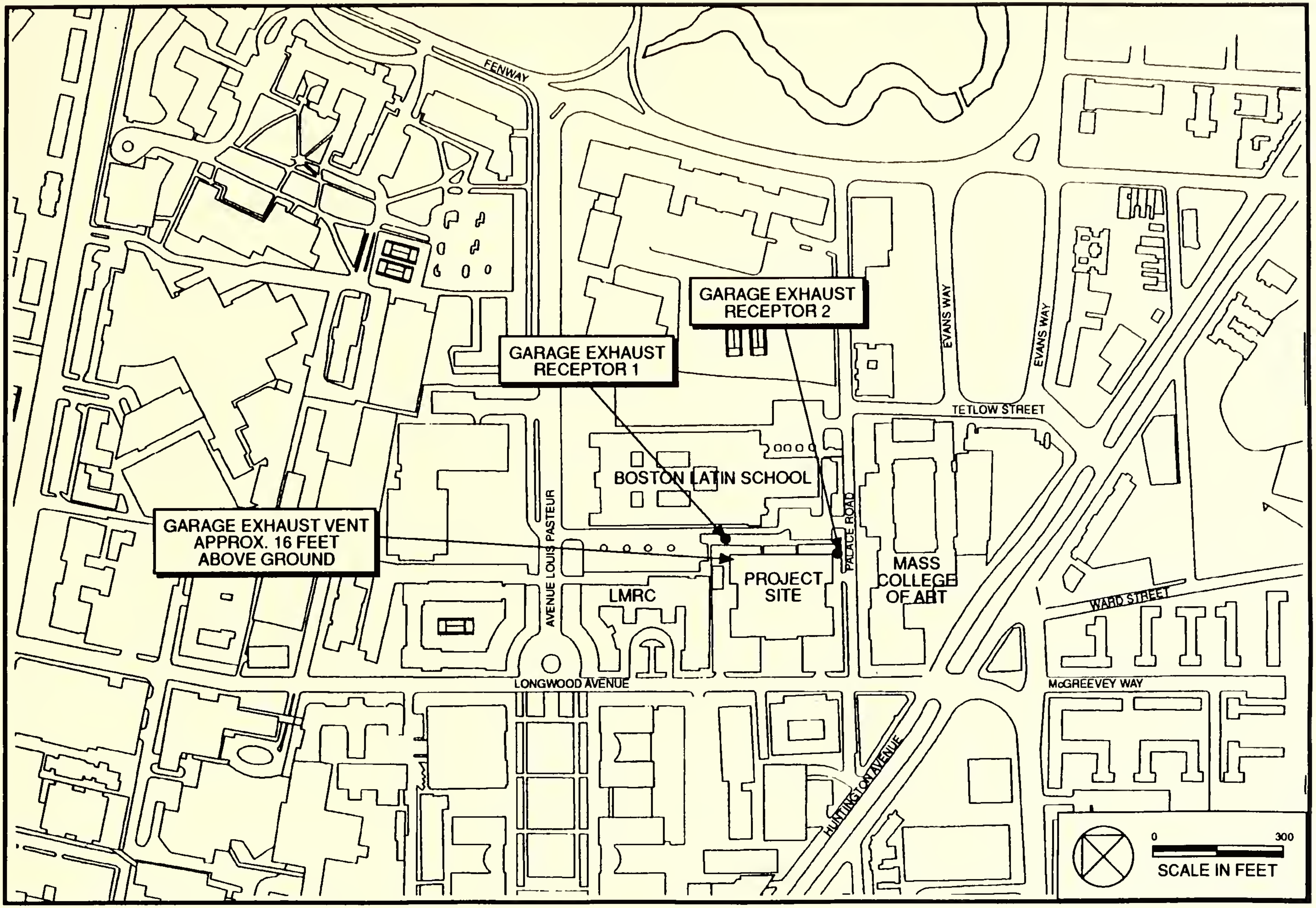


Figure IV-5.4
Garage Exhaust and Receptor Locations
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

the year 1998 to account for future traffic growth and motor vehicle emission reductions. Consistent with the traffic analysis, a 1% per year growth factor was used. In addition, MOBILE4.1 idle mode emission results demonstrate an approximate 36% reduction in motor vehicle emissions from 1993 to 1998. Scaling 1993 background levels by these factors provides 1998 values of 3.4 ppm and 2.0 ppm for the one- and eight-hour averaging periods.

A recent study of actual CO concentrations conducted for the Beth Israel Clinical Center Project[1] in the Longwood Medical Area noted background levels of 2.3 ppm for the one-hour averaging period and 1.7 ppm for the eight-hour averaging period. This study indicates background levels in the project area are likely below the DEP default values for Boston. Ambient CO concentrations using these site-specific background levels were provided in the DPIR/DEIR. Results provided below in this FPIR/FEIR document are conservatively based on the DEP default values.

5.2.3 Results

Maximum predicted one- and eight-hour CO concentrations at sensitive receptors are summarized in Tables IV-5.1 and IV-5.2. These values represent the highest potential concentrations predicted during the simultaneous occurrence of "defined" worst case meteorology and peak traffic. The results include the contributions of the intersections modeled, on-site parking facilities, and conservative background levels. The following summarizes the study results.

Huntington Avenue/Longwood Avenue

Air quality modeling of the Huntington Avenue/Longwood Avenue intersection demonstrates concentrations below the National Ambient Air Quality Standards (NAAQS) for CO in all cases, except at two receptors (Receptors A10 and A11) under the existing eight-hour case. These receptors are located near the southwest corner of the intersection (see Figure IV-5.1). At these locations, eight-hour average concentrations of 11.2 ppm and 9.2 ppm were predicted, respectively. The maximum one-hour value of 19.3 ppm occurred at Receptor A10.

During the 1998 future year cases, concentrations decrease so that no exceedances occur. For the no-build case, maximum one-hour and eight-hour concentrations of 12.5 ppm and 7.6 ppm are predicted. Under the build case, the maximum one-hour value increased slightly to 12.6 ppm, while the eight-

1 FPIR, The Clinical Center and Research North, Beth Israel Hospital, Boston, November 1992.

Table IV-5.1: Maximum Predicted CO Concentrations (PPM) from Intersections, On-Site Parking Facilities, and Background

		1993 Existing		1998 No-Build		1998 Build	
Intersection	**Receptor**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**
Huntington Avenue/ Longwood Avenue	A1	12.5	7.4	9.6	5.5	9.7	5.6
	A2	14.7	8.4	10.3	6.5	10.4	6.5
	A3	13.0	7.1	9.2	5.3	9.2	5.4
	A4	9.8	5.8	7.0	4.1	7.0	4.1
	A5	11.7	6.7	8.0	4.8	8.0	4.8
	A6	13.2	7.7	9.6	5.7	9.6	5.7
	A7	14.4	8.3	10.3	6.0	10.3	6.0
	A8	12.8	7.3	9.8	5.6	9.8	5.6
	A9	12.4	7.3	9.0	5.6	9.1	5.6
	A10	19.3	11.2	12.5	7.6	12.6	7.6
	A11	16.4	9.2	11.4	6.6	11.5	6.7
	A12	11.6	6.7	8.3	4.9	8.4	5.0
	A13	10.3	5.7	7.3	4.1	7.4	4.2
	A14	11.3	6.2	8.2	4.7	8.3	4.8
	A15	14.1	8.5	10.1	6.0	10.2	6.0
	A16	12.0	6.7	8.6	5.0	8.7	5.0
	A17	10.7	6.1	7.9	4.5	8.9	4.5
	A18	13.1	7.6	9.4	5.9	9.5	5.9
Brookline Avenue/ Longwood Avenue	B1	17.2	10.0	12.1	7.2	12.1	7.3
	B2	11.8	6.7	8.6	5.1	8.6	5.2
	B3	12.0	6.9	8.9	5.3	9.1	5.3
	B4	19.4	11.3	12.6	7.4	12.6	7.5
	B5	19.9	11.6	12.9	8.0	12.9	8.0
	B6	15.5	9.0	10.8	6.5	10.8	6.5
	B7	18.9	11.0	12.9	7.6	12.9	7.6
	B8	15.5	9.1	10.2	6.2	10.2	6.2
	B9	16.5	9.7	11.5	6.9	11.5	7.0
NAAQS		**35.0**	**9.0**	**35.0**	**9.0**	**35.0**	**9.0**

Table IV-5.2: Parking Garage Effects Adjacent to the Project Site

	Concentration (ppm)	
Location	**1-Hour**	**8-Hour**
Boston Latin School	4.2	2.5
Palace Road	3.6	2.1
NAAQS	**35.0**	**9.0**

A10. In general, concentrations at receptors around this intersection either remain the same or increase by only 0.1 ppm with construction of the Project.

Brookline Avenue/Longwood Avenue

Under existing conditions, there are no exceedances of the one-hour NAAQS, however, there are seven exceedances of the standard for the eight-hour averaging period. The maximum concentrations predicted for 1993 are 19.9 ppm (one-hour) and 11.6 ppm (eight-hour). Both of these concentrations occur at Receptor B5 located along the east side of Brookline Avenue, south of the intersection (see Figure IV-5.2).

Similar to the Huntington/Longwood intersection, future year concentrations decrease and exceedances of the NAAQS no longer occur. Highest concentrations in 1998 occur under both the No-Build and Build cases where one-hour and eight-hour concentrations of 12.9 ppm and 8.0 ppm are predicted. These future year concentrations were noted at Receptors B5 and B7 for the one-hour averaging period and Receptor B5 for the eight-hour averaging period (see Figure IV-5.3).

Additional Garage Receptors

Two additional receptors were evaluated for air quality effects from the parking garage vent; one was located at the closest point of the Boston Latin School, directly adjacent to the Project, and the other at Palace Road near the east corner of the New Building (see Figure IV-5.4 above). Maximum concentrations at these two locations are summarized below and demonstrate air quality levels well below standards (NAAQS) to protect the public health.

5.3 Laboratory Vents

Laboratories located in the New Building will include existing facilities currently located in the Newton Building (which will be demolished) and the Research Facility, whose proposed tenant is the Channing Laboratory.

Presently, many of the Project details, including laboratory ventilation, are in the design phase. Current plans, however, include exhausting laboratory vents up through a number of shafts which lead to the roof. Emissions will then be exhausted well above street level, around ten feet above the mechanical penthouse's roof (or approximately 135 feet above Longwood Avenue). Exhaust velocities will be on the order of 50 feet per second. Air intake for the Project will be from the north side facade facing the Boston Latin School at a height of approximately 90 feet above Longwood Avenue.

Air vented from the College's laboratories contain trace quantities of common organic solvents. Currently, measures to minimize these emissions include recovery and/or decomposition processes before venting to the exhaust system. These laboratory procedures will continue with construction of the Project and relocation of the laboratories. The Project will also provide additional benefits by improving dispersion. By increasing the vent exhaust height to approximately 135 feet above Longwood Avenue, additional dilution will occur for those trace amounts that are being emitted.

Emissions from the Research Facility will also be vented from above roof level similar to those from the College's laboratories. Laboratory emissions from the Channing Laboratories will include trace amounts of common organic solvents, particularly alcohols, and acids. These are essentially the same constituents already being vented from the Channing Laboratory facility directly across Longwood Avenue (at 180 Longwood Avenue). Again, the elevated release of these trace amounts will provide additional dilution.

5.4 Space Heating and Steam Facilities

The Project will include two new 500 horsepower (hp) boilers each rated at approximately 20 million Btu/hr (MMBtu/hr) heat input. Both units will be fired with natural gas. Typically, only one unit will operate at a time, except during periods when one unit is brought off-line and the other is simultaneously brought on-line. Generally, this period lasts only a few hours. Exhaust from these boilers will be emitted through stacks extending ten feet above the mechanical penthouse roof level or approximately 135 feet above Longwood Avenue. Emissions will be vented at a velocity of approximately 75 feet per second which will aid plume rise and dispersion. Presently, the College

operates a plant with two 106 hp boilers, each firing natural gas. This plant will be eliminated with the construction of the new boiler plant.

The following table provides emission estimates of the new boilers, existing boilers, and net change with the New Building.

Emissions (ton/year)

	Existing Plant	Proposed Project	Net Change	State and EPA Defined Significance Levels
Nitrogen Oxides (NO_X)	2.0	17.5	15.5	40
Sulfur Dioxide (SO_2)	nil	nil	nil	40
Particulates (PM-10)	0.1	0.2	0.1	15
Carbon Monoxide (CO)	0.4	2.6	2.2	100
Volatile Organic Compounds (VOC)	0.1	0.7	0.6	40

These data demonstrate that emissions will be well below significant emission levels set by the State. Further, these levels are well below the threshold (250 tons per year of any one pollutant) which would define the facility as a major source under DEP and EPA prevention of significant deterioration (PSD) regulations. The project's NO_X and VOC emissions are also less than the 50 ton per year threshold which triggers non-attainment review for ozone (both of these pollutants are considered precursors in the formation of ozone). The Project will, however, require non-major Comprehensive Plan Approval from the DEP, Air Quality Control Division. This permitting process applies to any fossil fuel utilization facility with an energy capacity equal to or greater than 40 MMBtu/hr, if firing natural gas. If the heat input rating is less than 40 MMBtu/hr, a Limited Plan Approval Process will be required. For either approval process, the Project will be required to complete forms summarizing the boiler facility and conduct a Best Available Control Technology (BACT) assessment to define the level of pollution control necessary.

Measures to mitigate emissions include the use of a clean fuel, natural gas. The use of natural gas virtually eliminates emissions of sulfur dioxide (SO_2) and reduces emissions of particulate matter (PM-10) to very low levels. For NO_X, the burners will be designed to reduce flame temperature and in turn reduce the emissions of NO_X. Based on expected BACT criteria, the boilers will also likely require induced flue gas recirculation (FGR). FGR is a control measure which returns hot boiler exhaust to the burner, reducing the peak flame temperature. This cooler flame reduces NO_X emissions. For other

pollutants, the BACT assessment will define measures (such as combustion controls) necessary to minimize emissions.

5.5 Conclusion

The results of the microscale analysis demonstrate ambient air quality standards for CO will be maintained with construction of the Project. Further, any concentration increases that occur are minimal since the Project is a small generator of traffic.

Also, the Project will be subject to review by the Massachusetts DEP under its Air Plans Approval process. This process will ensure the facility incorporates best available controls to minimize all emissions associated with the Project.

6.0 WATER QUALITY

The DPIR/DEIR's water quality analysis (Section IV-5.0) was sufficient to meet the BRA's PAD and Secretary's Certificate. All potential effects to water quality from the Project will be sufficiently mitigated as summarized below.

The Site is served by separate sanitary sewer and storm drainage systems. These systems convey sanitary sewage to the Deer Island Water Treatment Plant and storm drainage to the City's stormwater system and eventually to the Muddy River and to the Charles River.

Wastewater to be discharged into the sanitary sewer, laboratory, process, and domestic uses will be further discussed in the Industrial User Sewer Discharge Permit application to be filed by the College and BWH (for the Channing Laboratory) with the MWRA.

The Site is currently fully developed with existing buildings or paved parking areas. Following construction of the Project, the quality of the runoff may improve by installing new collection roof drains. Much of the post-development Site runoff will consist of roof runoff which is typically considered clean.

Sediment and oil and grease traps will be placed in the parking garage drains and delivery area drains to reduce contaminant loadings to the Muddy River. These traps will be periodically cleaned to maintain capture ability. In addition, litter sweeps will be made as needed on pedestrian walkways to control the amount of debris that is entrained in storm water runoff.

Further elaboration of water quality effects, required permits, and mitigation measures for the Project is presented in the DPIR/DEIR.

7.0 NOISE

7.1 Introduction

The BRA's PAD and Secretary's Certificate determined that the noise analysis conducted by the College in the DPIR/DEIR was sufficient to meet the Project's Scopes. A summary of the noise analysis is provided below. A more detailed discussion can be found in Section IV-6.0 of the DPIR/DEIR.

7.2 Existing Noise Environment

An ambient noise level survey was conducted to characterize the existing acoustical environment in the vicinity of the Site. The survey was conducted to measure the combined noise level from all local noise sources at each of the selected receptors. Significant noise sources in the area around the Site include mechanical equipment at several institutional and residential facilities, and traffic. Considerable traffic was observed along Longwood Avenue, Avenue Louis Pasteur, and Huntington Avenue during the measurement periods. The noise measurements were taken from the following sources:

- Massachusetts College of Pharmacy and Allied Health Sciences
- Massachusetts College of Art
- Harvard Medical School
- Longwood Medical Research Center
- Boston Latin School

The primary noise source at the existing facility is the mechanical equipment located on the roof of the White Building and the Newton Building.

7.3 Operational Noise Effects and Mitigation Measures

Noise control is an inherent consideration in the design of a major urban facility. The noise control designers must analyze all of the potential noise sources at the facility and all of the noise propagation paths between these sources and sensitive locations inside and outside of the facility. Specialized noise control treatment is then designed for each individual noise source identified as potentially producing excessive noise at sensitive locations.

The following locations were modeled as noise receptors for the study.

- Massachusetts College of Art Property
- Harvard University Police Station
- LMRC
- Boston Latin School

- Apartments at the corner of Tetlow Street and Palace Road
- Apartments bounded by Huntington Avenue, Longwood Avenue, and Worthington Street

Mitigation

Operational noise levels for the College's New Building will meet requirements of the City of Boston Noise Ordinance and DEP Noise Policy at all receiving properties. This will be achieved by significant attention to noise control in both the initial and later stages of design. Most of the Building's noise producing equipment has been placed on the roof or in the penthouse, taking maximum advantage of distance and directivity to nearby properties. The roof line will be constructed in a way to make a natural barrier to noise from the rooftop cooling towers.

As the design is further developed, additional noise mitigation features will be selected to meet the requirements of the Boston Noise Ordinance at the property line nearest the penthouse louvered openings. These may include but are not limited to the following:

- Installation of Noise Control Louvers on some or all of the ventilation openings

- Installation of silencing material in the ductwork and plenums associated with the building's mechanical system

- Arrangement of various pieces of equipment in the penthouse to minimize the noise exposure to building openings

- Application of sound absorptive material to noise sources or reflective surfaces around the sources

Conclusions

In summary, existing ambient noise levels were observed to exceed the City of Boston residential standards under conditions typical of the quiet periods for the area. Since the equipment will be placed more than 100 feet higher than the existing equipment, the noise contribution from the College equipment at ground level locations will be less than existing levels. Operation of the New Building is not expected to increase the ambient noise levels present in the community. The results of the analysis demonstrate that the facility design can meet all requirements of the City of Boston noise regulations. This equates to very nearly the same noise levels that presently exist near the Site.

The community noise levels are expected to be very nearly the same as presently exist near the Site. Since the DEP's Noise Policy is based on a 10 dBA increase to ambient levels, the Project will be well below DEP limits.

8.0 GEOTECHNICAL

8.1 Introduction

The BRA's PAD and the Secretary's Certificate concluded that the Geotechnical Analysis contained in the DPIR/DEIR (Section IV-7.0) is sufficient to satisfy the scoping requirements, except that the FPIR/FEIR should indicate whether there will also be a need to underpin the Boston Latin School adjacent to the Project Site and if not, the basis for this determination. A discussion of this response is contained in Section 8.3.1 below, in addition to an updated geotechnical analysis.

8.2 Existing Site Conditions

A geotechnical engineering investigation of the Site was performed by Haley & Aldrich, Inc. Six test borings were drilled in 1991, in addition to six test borings performed previously for an existing building on-site. Groundwater observation wells were installed in each of the six 1991 completed boreholes. Subsurface soil conditions were observed in the test borings to generally consist of 9 to 15 feet of fill overlying dense to very dense marine sand and stiff to hard marine clay. The sand and clay were found to extend to depths up to 99 feet in the test borings. The groundwater observation wells indicate that the groundwater level varies across the Site from about elevation (El) 12 feet to El 15 feet (Boston City Base) near Palace Road (the east side of the Site) and El 15 feet to El 17 feet at the west side of the Site. Groundwater levels were also observed to vary with time and precipitation.

8.3 Geotechnical Effects from the Project

8.3.1 Foundation Construction and Excavation

The New Building will bear on a reinforced concerete mat foundation at approximately El 7 feet. The marine sand and clay present at that elevation are suitable to support the New Building, with a design allowable bearing pressure of three tons per square foot. The White Building and the LMRC will be underpinned prior to excavation due to their close proximity to the excavation area. The Boston Latin School will not require underpinning due to its distance from the Site. As a result of the lower Site topography and distance available between the east (Palace Road) side of the New Building and the property line, the preliminary proposal is to excavate this side of the Site as an open cut, with possibly some additional length of open cut excavation on the north side of the Site near Palace Road. It is proposed by the contractor to support the remaining sides of the excavation by using soldier piles with wood lagging, braced as necessary with corner or raker braces, or tieback anchors.

The dense or stiff marine soils present at the Site will substantailly reduce the potential for settlement of adjacent buildings in the event of excavation support system movement. The excavation support system and underpinning specifications will include performance criteria to limit movements of adjacent buildings, utilities and streets to acceptable levels.

The volume of soils to be excavated is in the range of 25,000 cubic yards. Excavation is intended to be performed with conventional earthwork equipment (i.e., backhoes, bulldozers). Soil will be loaded directly onto trucks and disposed of off-site in accordance with the Commonwealth of Massachusetts DEP solid waste disposal regulations.

8.3.2 Construction Dewatering

As a result of the presence of pervious marine sand and clay to depths of 99 feet, primarily on the south and west sides of the Site, it will be necessary to temporarily lower the groundwater table to allow foundation construction. Similar dewatering efforts have been performed for adjacent projects, without detrimental effects on adjacent properties, because of the high relative density of the foundation soils. No adjacent buildings are supported by timber piles.

8.3.3 Groundwater Effects

The existing marine sands will remain below, surrounding the proposed structure; therefore, any existing groundwater flow patterns will not be significantly affected by the below-grade portions of the Project. The new construction will be designed to resist hydrostatic pressure. It will not include underdrains which would permanently lower the groundwater table.

8.3.4 Foundation Construction Mitigation

On-site monitoring of the contractor's construction activities will be provided by the College's geotechnical engineer until the below-grade portions of the Project are completed. This will insure an independent analysis of the contractor's compliance with the Project specifications, and will enable early notification and correction of any on-site problems that may develop.

The College's geotechnical engineer will also install and monitor appropriate survey points and geotechnical instrumentation to document the performance of the excavation and effects on nearby properties. Such monitoring is planned to include measurements of building settlements, ground and earth support system movements, and other data. This information can provide aid in warning of unacceptable excavation performance and enable corrective procedures to be immediately implemented.

Prior to construction, the contractor will be required to provide the College with contingency procedures to be undertaken in the event of excessive excavation movement. Such measures might include altering the excavation procedure or installation of additional bracing. These procedures are consistent with accepted construction practice.

9.0 SOLID AND HAZARDOUS WASTES

9.1 Introduction

The BRA's PAD and the Secretary's Certificate concur that this section was adequately covered in the DPIR/DEIR (Section IV-8.0) to satisfy the scoping reuqirements. A summary of the DPIR/DEIR section is provided below.

9.2 21E Summary

A oil and hazardous material evaluation has been performed for the College at the Site by Haley & Aldrich, Inc. No surficial evidence of oil or hazardous material releases was observed during the Site visits. Observations and screening of soil samples from subsurface explorations did not indicate the presence of visual or olfactory evidence of oil or hazardous materials. Results of limited chemical analyses of a groundwater sample indicate that volatile organic compounds were not detected in the tested sample and that only trace concentration of total petroleum hydrocarbon was detected.

No incidents involving release of oil or hazardous material at the Site have been recorded by local authorities or DEP. The Site is not listed by DEP on its "List of Confirmed Disposal Sites and Locations to be Investigated."

Based on the results of the limited subsurface explorations performed at the Site, the results of limited chemical analyses, and on available historical and surficial information, there is no current evidence that DEP would consider the Site to be a disposal site or a location to be investigated under the Massachusetts General Law, Chapter 21E and the Massachusetts Contingency Plan (MCP) at the present time.

9.3 Construction Waste

The demolition of the Newton Building and the Garage/Office Building is anticipated to last approximately two months and result in construction debris of approximately 4,000 cubic yards. The Project will also generate approximately 11,200 cubic yards of construction debris. Construction debris will consist primarily of wood, metal, and non-contaminated steel, some of which may be recyclable (wood, steel, masonry). If the construction debris cannot be recycled, it will be removed by the contractor and properly disposed.

Prior to demolition and construction, the contractor will have a qualified professional determine if there is any asbestos in the existing buildings. If any exists, the College will have it removed by a licensed contractor. Any

contaminated waste will be handled and disposed of by a licensed contractor in an approved landfill in compliance with all applicable local and state regulations.

9.4 Waste Management Plan

Upon completion of construction, solid waste generated by the College will increase as a result of new research and laboratory uses, additional offices and classrooms, and student living space.

Solid waste generated by the Project is estimated to be approximately 250 tons per year. This number is based on 1.33 tons per 1,000 square feet.

The College will use its existing waste management plan to dispose of the additional operational waste generated by the Project. Rubbish removal is picked up three (3) times per week by BFI Industries. Any chemical waste generated by the College and the Research Facility will be stored in properly vented and insulated cabinets. It is picked up by a licensed contractor.

Dumpsters will be located in the service area within the garage, and will be concealed from view.

9.5 Recycling

The College currently recycles white paper and cardboard. This recycled material is picked up twice a month by BFI Industries.

The College will continue its recycling program and will expand it to additional materials associated with the cafeteria and research and laboratory space such as glassware, bottles, plastic containers and styrofoam. The loading area will provide ample space for an expanded recycling initiative.

10.0 CONSTRUCTION

10.1 Introduction

An evaluation and description of the construction process and potential impacts from construction was developed for the Project's DPIR/DEIR. The BRA's PAD and Secretary's Certificate found this section to be adequately addressed in the DPIR/DEIR. The section below summarizes the construction evaluation presented in Section IV-9.0 of the DPIR/DEIR.

A Construction Management Plan (CMP) will be submitted to BTD for approval prior to the start of construction. The CMP will include specific mitigation measures and staging plans to minimize effects to the abutters.

10.2 Construction Schedule

All construction and completion dates are approximate and may be affected by delays due to permitting, financing, weather, and other matters beyond the control of the College. The construction period for the College's Project is expected to last approximately two years. Construction will begin in July 1993 and be completed in August 1995. Typical construction hours for the Project will be from 7:00 AM to 3:30 PM, Monday through Friday, although steel erection, foundation preparation, concrete pouring, and masonry work may extend to 5:30 PM on weekdays. The phases of construction are identified below.

10.2.1 Demolition of the Newton Building and the Garage/Office Building

The Newton Building at the rear of the Site and the Garage/Office Building to the western side of the Site will be demolished as part of the Project. As noted below, the buildings will first be cleared of any asbestos. The building demolition will commence July 1993 and be completed in a month. Due to the buildings relatively small size, they will be demolished with jack hammers, concrete saws and front-end loaders.

10.2.2 Parking Garage

The Garage will be located in the basement of the New Building. The work on the Garage will commence in July 1993 concurrent with demolition activities and be completed by December 1993. The work will commence with excavation of approximately 25,000 cubic yards of material with conventional earthmoving equipment. The initial step in this phase will be to establish a

staging area and perimeter project around the site to be excavated. Dewatering will be required during this construction phase. The end of this phase will be coincident with the start of the structural frame erection of the New Building.

10.2.3 White Building Corner Infill

This will consist of new construction of two levels at the northwest and northeast corners of the White Building for academic support facilities and offices. The work will commence in August 1993 and be completed in October 1993. This component of the Project will include all stages of construction from foundation work, framing to interior finish work. Construction activities for this phase will be completed with the physical construction to the existing White Building and tie-in of utilities.

10.2.4 Academic Portion

The two-story academic base is under the Dormitory and Research Facility portions described below. Work on this portion of the Project will commence following completion of the garage construction (below the New Building) and be completed in August 1995 (at the same time the dormitory portion is completed).

10.2.5 Dormitory Portion

The dormitory portion of the Project is on the east side of the New Building. Work on the dormitory will commence December 1993 and be completed in August 1995. Foundation work for the New Building will be completed as part of the garage construction (below the New Building).

10.2.6 Research Facility Portion

The Research Facility will be constructed in the western portion of the New Building. The timing and steps involved in the construction of this component will be the same as those listed above in the Dormitory Portion, with the exception that the interior finish work to outfit the building for laboratory use.

10.2.7 White Building Renovation

Phased renovation of the White Building will occur primarily in the interior of the building and at the entrances. Renovations to the White Building will extend beyond the completion of the New Building and will be phased based on funding availability and academic schedule constraints. These renovations will consist of upgrading the building to current building code requirements

and to handicap access regulations. Other renovations planned at the White Building include construction of new occupiable basement and attic space, and improved recreation area, administration library, and classroom space.

10.3 Construction Air Quality

During the construction period of the College's Project, temporary effects on air quality at, and adjacent to, the Site may occur. Effects associated with demolition, land clearing, ground excavation, and other construction activities may generate fugitive dust, which will result in localized increases in airborne particulate levels.

To minimize emissions of fugitive dust and minimize effects on the local environment,the following mitigation measures will be utilized:

- During dry periods, wetting agents will be applied to areas of exposed soil and demolition activities on a scheduled basis
- Covered trucks for transportation of excavated material and demolition debris
- Minimizing storage of debris on-site
- Locating aggregate storage piles away from areas having the greatest pedestrian activity
- Monitoring actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized
- Periodic cleaning of streets and sidewalks to minimize dust accumulations

10.4 Construction Noise Effects

Although the College is committed to mitigate impacts of the construction of the Project, increased community sound levels are an inherent consequence of construction activities. A detailed assessment of the potential noise effects from construction was presented in the DPIR/DEIR in Section IV-9.3. This consisted of a review of the City of Boston's construction noise regulations, the results of an existing noise survey, and an evaluation of construction noise sources. On the basis of this analysis, it can be concluded that the construction noise standards of the City of Boston will be complied with and that construction noise will not interfere with typical daytime activities at the College or neighboring residences or institutions.

The contractor will be responsible for construction material delivery sequencing to ensure that surrounding roadways are not blocked due to construction vehicles being double parked while waiting to enter the job-site to make pick-ups or deliveries. The College realizes the importance of maintaining the existing flow of traffic in the surrounding area.

10.7 Employee Trip Generation and Construction Worker Parking

The number of workers required during the construction period will vary, with an estimated average daily work force of approximately 150 workers during the peak of construction. It has been estimated in the DPIR/DEIR that 136 vehicle trips will be generated between 6:00 and 7:00 AM and again between 3:00 and 4:00 PM. As the construction workers usually arrive and depart before the commuter peak hours, the construction traffic is not expected to have a significant effect on the peak hour traffic. Construction workers will be encouraged to use public transportation. Ample secured storage for tools will be provided on-site so that workers will not need to transport their tools to and from the Site on a daily basis which will alleviate the need to drive to the Site.

10.8 Additional Construction Issues

Full discussion of potential construction effects on groundwater; the demolition effects; and rodent control requirements are discussed in the DPIR/DEIR (see Section IV-9.7 through IV-9.9).

V. URBAN DESIGN COMPONENT

V. URBAN DESIGN COMPONENT

1.0 INTRODUCTION

In accordance with the BRA's PAD, the Urban Design Component will address design changes made since the submission of the DPIR/DEIR including a new landscape design for the front yard (along Longwood Avenue) which maximizes the amount of green space, expands the pedestrian zone at the College's front entrance, minimizes the number of parking spaces, and improves the visual quality of materials through the use of brick and masonry pavers in place of asphalt in the parking areas as approved on May 4, 1993 by the BCDC. In addition, revised floor plans that are more legible are included in the revised Schematic Design Submission as approved by the BRA on May 27, 1993 (see Appendix F).

1.1 Site Location

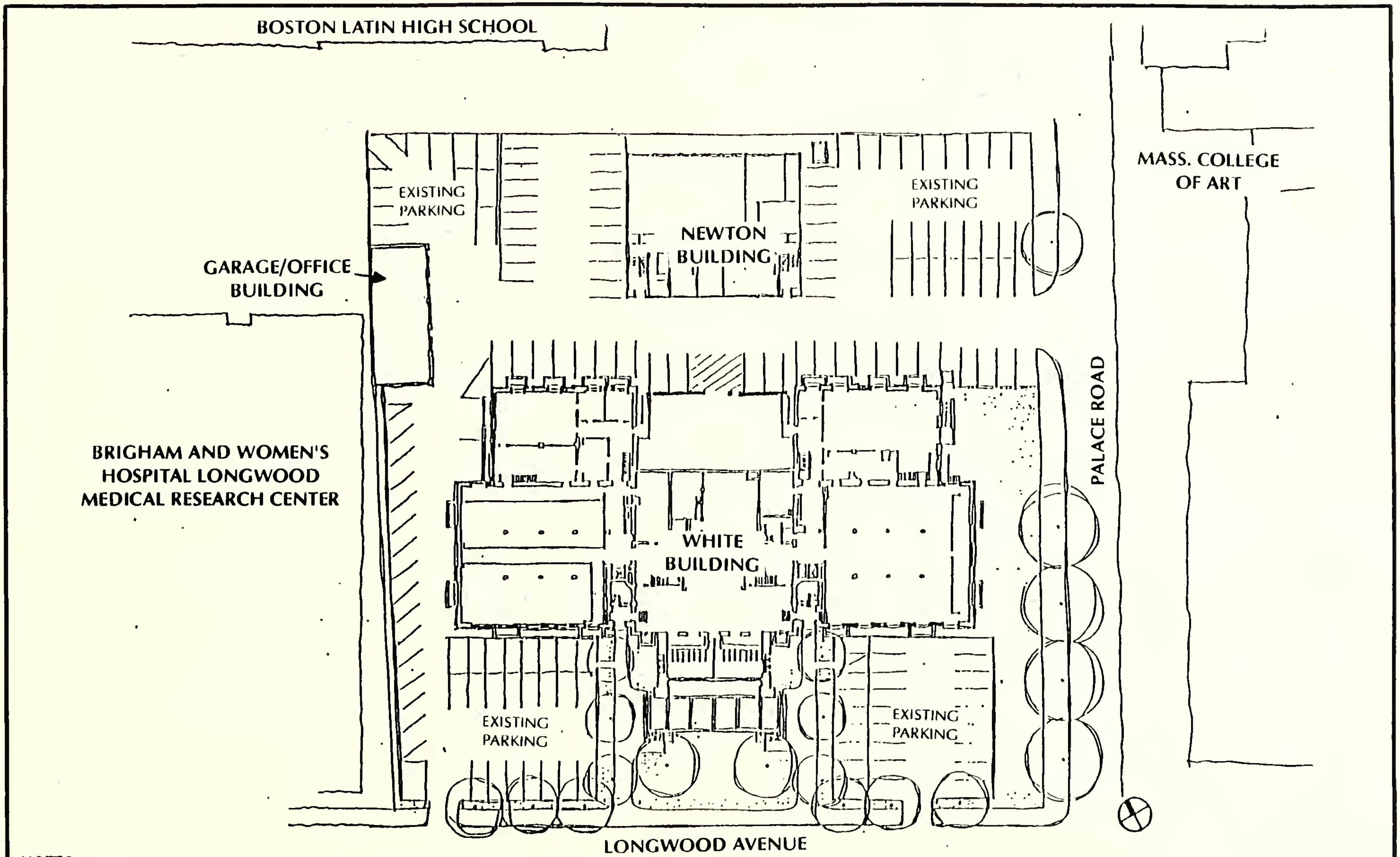
The Site is located in Boston's Longwood Medical Area at 179 Longwood Avenue. It is bounded by Longwood Avenue on the south, Palace Road on the east, Boston Latin School on the north, and the LMRC on the west. The facilities of Massachusetts College of Art are located on the east side of Palace Road across from the Site. Facilities of the Harvard Medical and Dental Schools as well as the School of Public Health are located on the south side of Longwood Avenue opposite the College's White Building.

1.2 Existing Uses

Three buildings are currently located on the 90,147 square foot (approximately two acre) site (see Figure V-1.1). These buildings include the White Building, built in 1917; the Garage/Office Building, built in 1917; and the Newton Building, built in 1961. There are also 150 spaces located in three on-site, surface parking areas. The one-story Garage/Office Building and four-story Newton Building will be demolished as part of the Project.

1.3 Need for Proposed Project

The Project described in this FPIR/FEIR includes three components: (1) phased renovations to the White Building and construction of two new additions to the second and third floors and one below-grade addition, (2) construction of a New Building to the rear of the White Building, and (3) a below-grade parking garage for approximately 91 to 96 spaces.



NOTES
PLAN BY: SHEPLEY, BULFINCH, RICHARDSON AND ABBOTT – ARCHITECTS

Figure V-1.1
Existing Site Plan
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

The need for the College's program is presented below:

- **Renovation of the White Building** - This facility is currently overcrowded and its space is inadequate for the College's present needs. The White Building has served as the College's primary academic facility since 1917. The proposed renovations and additions will result in improved library, administrative, classroom, and recreation spaces.

- **Construction of the New Building** - The New Building will consist of an eight-story "mixed use" structure which will accommodate three programmatic components: academic, student life and student housing, and research laboratories. A portion of the six upper floors on the west side will be leased to BWH for a research facility. The six upper floors on the Palace Road side will provide dormitory space for 175-180 students. The lower two floors will accommodate academic teaching and research facilities, a student "Commons", and dining facilities. A rooftop penthouse contains space for major mechanical and electrical equipment primarily serving the New Building.

- **Parking Garage** - A one-level, below-grade parking garage will accommodate approximately 91 to 96 cars, replacing the 100 surface spaces currently to the rear of the White Building. There will be a decrease in the 150 parking spaces currently on-site. Parking will not exceed 124 spaces, including the spaces in front of the White Building which will be reduced from 50 to 28 spaces. Access to the garage will be provided from Palace Road.

See Table V-1.1 for Site and Space Program Summary.

1.4 Alternative Programs for Proposed Project

The College's need to provide on-campus student housing and additional research facilities for its students and faculty has been the driving force behind this Project from the outset. In order for the College to continue its pre-eminent position in the education and training of pharmacists and other health-care professionals, and in developing new skills to meet the challenges of future developments in medicine and health-care practice, the College must provide up-to-date research and teaching facilities and affordable, on-campus student life facilities, such as housing and dining facilities.

Table V-1.1: Project Site and Space Program Summary

A. FLOOR AREA

Component	*Existing Total Area* gsf(1)	*Proposed Total Area* gsf(1)	*Proposed Area* GSF/FAR(2)
White Building	101,653	109,477	96,781
New Building (Alternative B)			
Garage	0	30,628	0
Service Level	0	29,565	18,356
Levels 1 to 8	0	157,497	152,895(3)
Mechanical Penthouse	0	15,860	0
Subtotal		233,850	171,251
TOTAL PROJECT	101,653 gsf	343,327 gsf	268,032

B. SITE AREA: 90,147 sf

C. FAR(2): 2.97

D. PARKING

	Existing	*Proposed*
Surface Spaces	150	28
Garage Spaces	0	91 to 96
Subtotal	150	119 to 124

1. Areas in gross square feet (gsf)
2. FAR calculation in accordance with Boston Zoning Code.
3.

		FAR/GSF	*gsf*
Levels 1 and 2:	Academic	43,902	44,555
Levels 3 and 8:	Student Housing/Dormitory	40,882	42,307
Levels 3 to 8:	Research Facility	68,111	70,635
TOTAL		152,895	157,497

Notes: All areas for the proposed New Building and White Building are based on current schematic design, and are subject to change as the design is developed in greater detail. However, the total FAR area will not exceed 270,441 GSF/FAR, or an FAR of 3.0.

The College has considered a number of alternative designs before arriving at the preferred Project (Alternative B) to meet the College's programmatic requirements. Additional setbacks of Alternative B's mechanical penthouse has been studied by the College's architects as requested in the BRA's PAD. No further setback is possible, and as discussed in the daylight analysis (Part IV, Section 4.0) little is gained in reduction to daylight obstruction from any further setback to the rooftop mechanicals.

The College originally considered renovating the Newton Building located behind the White Building. The renovations included adding approximately two stories to the four-story building, refitting the building with additional laboratory and classroom space, and bringing the building up to code. This alternative was determined to be too costly.

The College also considered replacing the Garage/Office Building, located behind the White Building adjacent to the LMRC, with an L-shaped midrise building to accommodate academic facilities. The configuration of this building was inadequate for the program needs of the College.

1.5 Alternative Locations for the Proposed Project

The College's sole property is limited to the two acres within its existing Site at 179 Longwood Avenue. The only available land for its future uses is that currently proposed for the New Building.

Continuing to lease dormitory space at Emmanuel College would be a partial alternative to the proposal. This leased space, however, is not guaranteed to the College on a long-term basis beyond 1995. Availability of dormitory space is critical as it assures that the College will continue to attract students and be able to continue operations in the City of Boston.

The College needs new classrooms, faculty offices, state-of-the-art laboratory space, and student services. No appropriate rentable classroom space has been identified in close proximity to the existing Site. Leasing off-site classrooms and other academic space is not conducive to fulfilling the mission of the College.

2.0 DESIGN APPROACH FOR PREFERRED PROJECT

2.1 General

The New Building, the White Building, and the connecting element between the two buildings will present a new, unified composition on the Site that is compatible with its urban context (see Figure V-2.1). The major symmetrical axis and entry of the White Building will be respected by the symmetrical placement of the New Building. The New Building, located behind the White Building and setback from Longwood Avenue, will be unobtrusive from the Longwood Avenue sidewalk.

The east facade of the White Building along Palace Road will be visually extended by creating a significant new landscaped yard and entry facade between the two buildings and by using similar materials and detail elements, such as brick and cast stone, that visually tie the two buildings together. Renovations to the White Building will preserve and improve it.

The height of the New Building to the roof of the main mechanical penthouse will be approximately 135 feet above the average grade along Palace Road (EL. 25), plus approximately 10 feet for a small penthouse for elevators and HVAC equipment (see Figure V-2.2). The proposed horizontal cornice line is an important architectural element which minimizes the apparent height of the New Building; as an architectural element, it also provides a link and reference to the architectural vocabulary of the White Building. The penthouse element is the top element of the "base/middle/top" organization of the New Building and is articulated to provide visual interest and scale to the roofscape. The long facades of the New Building have been articulated to break down the scale and provide an appropriate relationship to the White Building. The short facades will have a curved "bay window". Major materials will be brick, precast concrete, and painted metal framed windows with clear "low-E" glass. Brick and precast color and texture will be carefully coordinated with the brick and limestone of the existing White Building.

At-grade parking to the rear of the White Building will be replaced with below-level parking. The parking in the front of the White Building will be reduced from 50 spaces to 28 spaces, and additional landscaping and more compatible paving materials will be provided in place of the existing asphalt. The area adjacent to the Boston Latin School pathway will be landscaped, terraced and designed to be at or near existing Latin School grade (see Figure V-2.3).

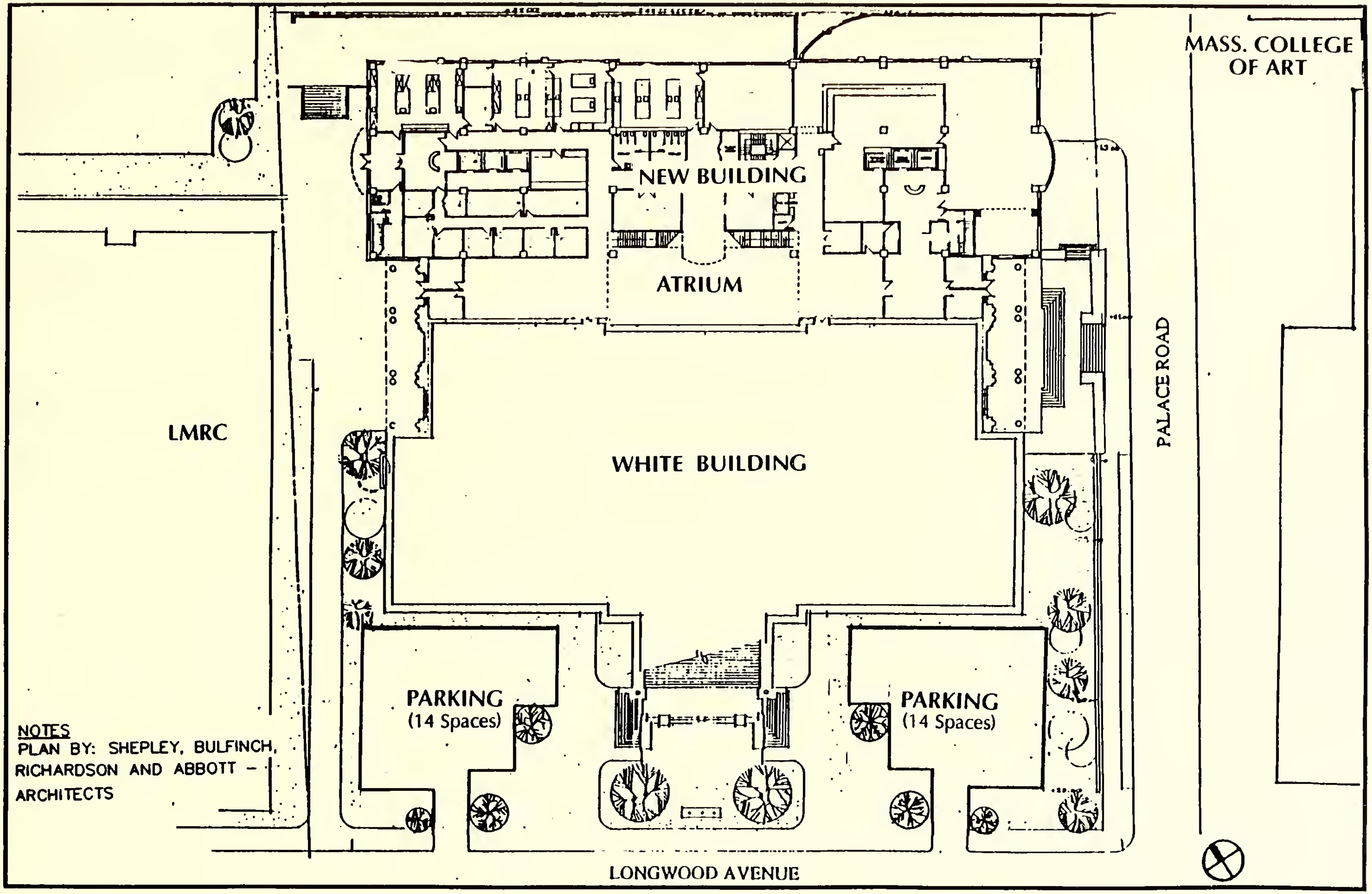
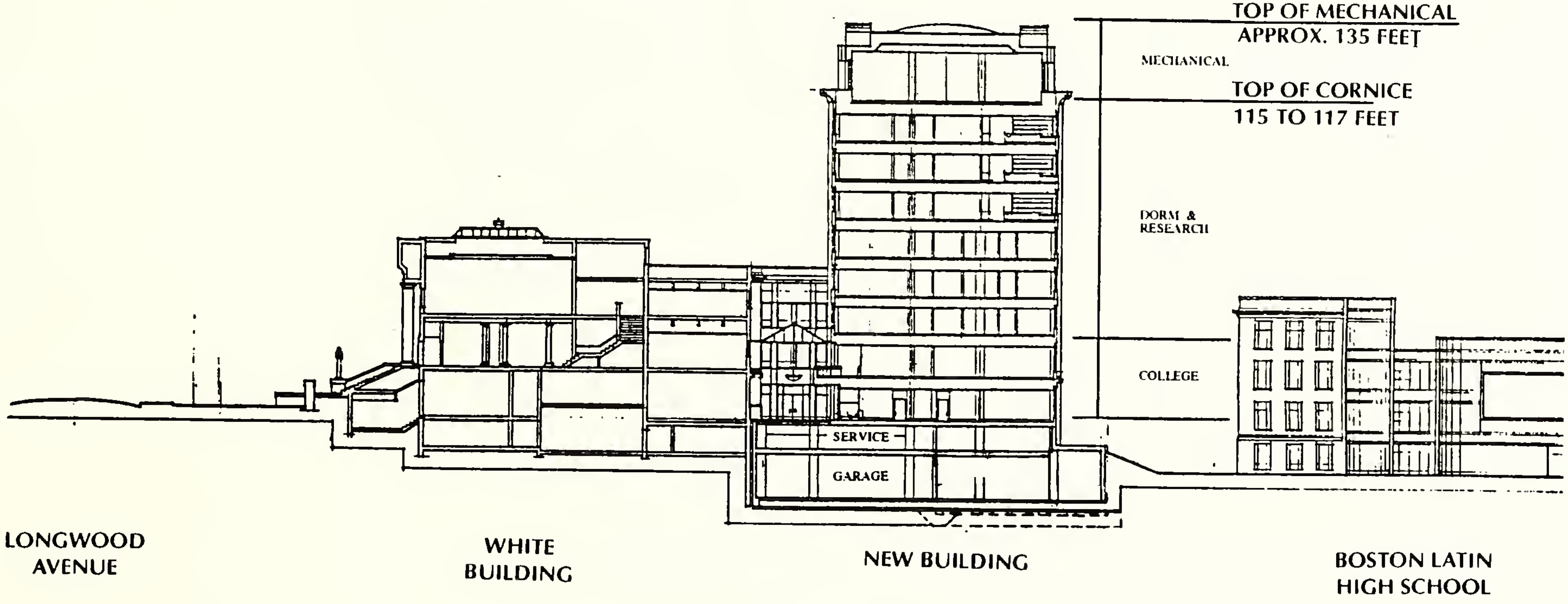


Figure V-2.1
Proposed Site Plan (Alternative B)
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company



NOTES:
Plan By: Shepley, Bulfinch, Richardson and Abbott - Architects
Heights: Above Average Palace Road Grade

Figure V-2.2
Section From Palace Road
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

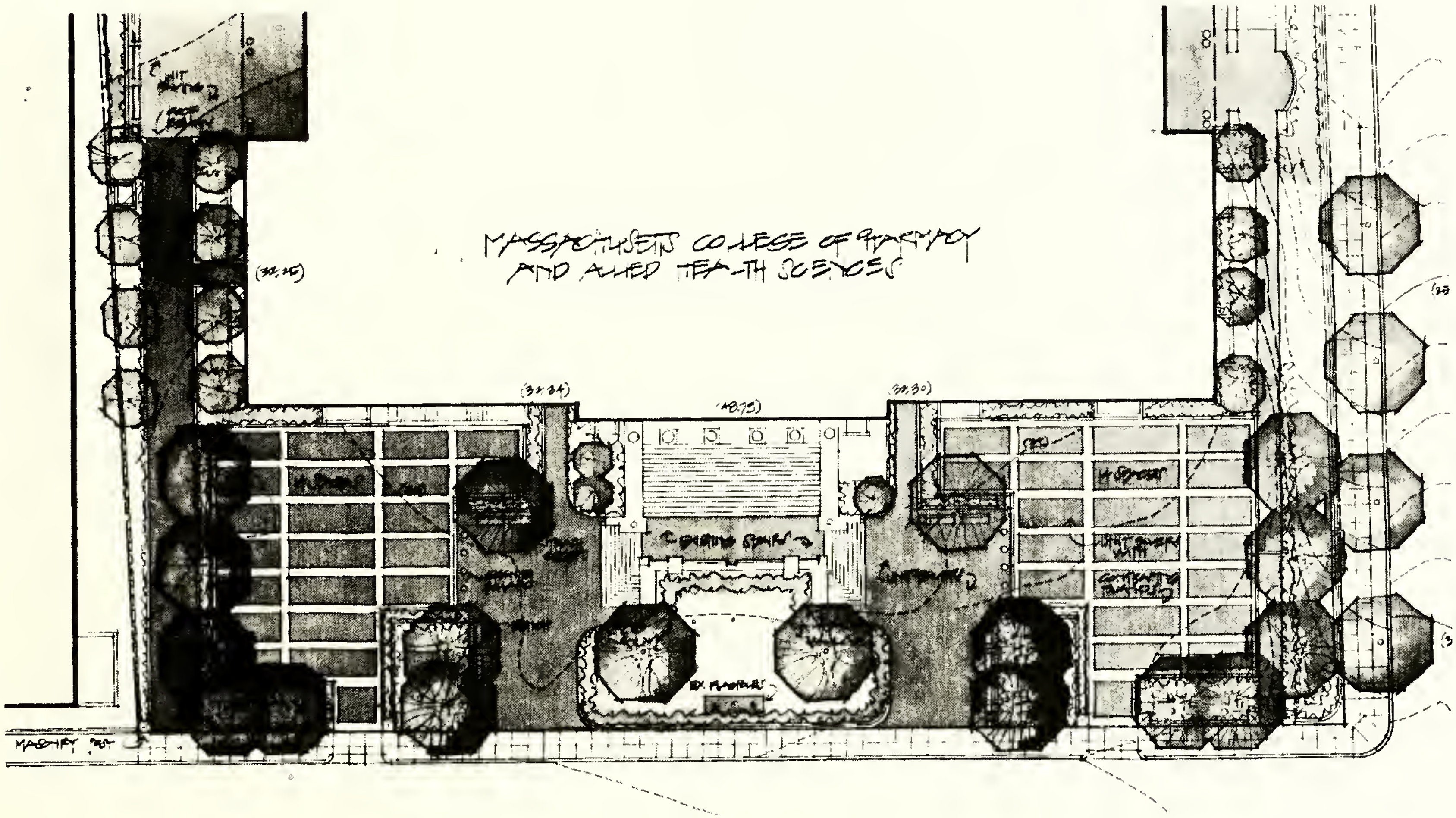
At-grade parking to the west of the White Building will be removed and replaced with a new landscaped walkway to the College and Research Facility entrance. Vehicular and service traffic will be separated and concealed in a covered area at the northeast corner of the Site, improving existing conditions and avoiding any negative effect on the street and to pedestrian movement.

In summary, the design of the Project addresses BRA design issues contained in the BRA's February 16, 1993 Scoping Determination and its PAD of May 21, 1993, as follows:

- **Replace Existing Parking Lot in Front Yard with Landscaped Open Space to Enhance the Pedestrian Environment** - This issue, initially raised by BRA staff, was addressed by the College in a revised site plan identifying additional landscaping at the March 2, 1993 public presentation to the BCDC. In this plan, parking capacity was reduced from 50 spaces to 28 spaces, and major landscaping improvements made to the Longwood Avenue frontage. This revised site plan (see Figure V-2.3) was approved by BCDC on May 4, 1993 as a part of BCDC's approval for the Project and by the BRA on May 27, 1993

- **Maximize Distance Between Project and Boston Latin School to Reduce Shadow Impact on Classroom Windows** - The proposed Project sets the New Building approximately 17 feet back from the property line at the Boston Latin School. This increase in setback, greater than the original proposal contained in the PNF, reduces shadows on the classroom windows during the fall and spring seasons. Shadow effects are fully discussed in the DPIR/DEIR.

- **Augment the Effort to Preserve an Attractive Building Front on Palace Road** - Major improvements have been made to the original PNF design to enhance the pedestrian scale and character along Palace Road and to maintain an attractive building front on Palace Road.



SHEPLEY BULFINCH RICHARDSON AND ABBOTT • ARCHITECTS

Figure V-2.3
Landscape Design for Front Yard
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

The truck-loading area, originally proposed in the PNF Alternative as an open area off Palace Road, opposite the Massachusetts College of Art service area, has been relocated and placed under the New Building and enclosed within the garage level. Trucks will be completely shielded from view and will not visually impact the street environment. In addition, all automobile parking currently located in a large, on-grade parking lot bordering Palace Road will be relocated into an underground parking garage, where it will not be visible from the Palace Road sidewalk.

A major pedestrian entrance to the New Building accessed from the Palace Road sidewalk forms a link between the White Building and the New Building. This entrance will be terraced and landscaped and will add an attractive architectural element to the Palace Road frontage.

- **Reduce the Apparent Building Height by Emphasizing Cornices and Reducing the Roof Volume** - The cornice line as depicted in Figure V-2.2 is approximately 115 to 117 feet above Palace Road. This cornice minimizes the apparent height and better integrates the White Building with the architecture of the New Building.

- **Develop the Facade Design to Reinforce, Without Necessarily Imitating, the Masonary Character of the District** - The proposed building material will include brick and precast concrete. Color and texture will be carefully coordinated with the materials of the White Building, and neighboring buildings.

2.2 Setback

The proposed Project will not impact the existing setback along Longwood Avenue. Along the Boston Latin School property line, the setback will be approximately 17 feet (an increase of 7 feet over the earlier PNF Alternative). Similarly, the 15-foot setback along Palace Road is 5 feet greater than in the PNF Alternative. The setback along the lot line with the LMRC is approximately the same as the existing White Building.

2.3 Pedestrian Access

Pedestrian access to the College will continue from Longwood Avenue through the White Building's main entrance. Additional access points will be provided to the Atrium Area from Palace Road and from the walkway to the New Building adjacent to LMRC (see Figure V-2.4).

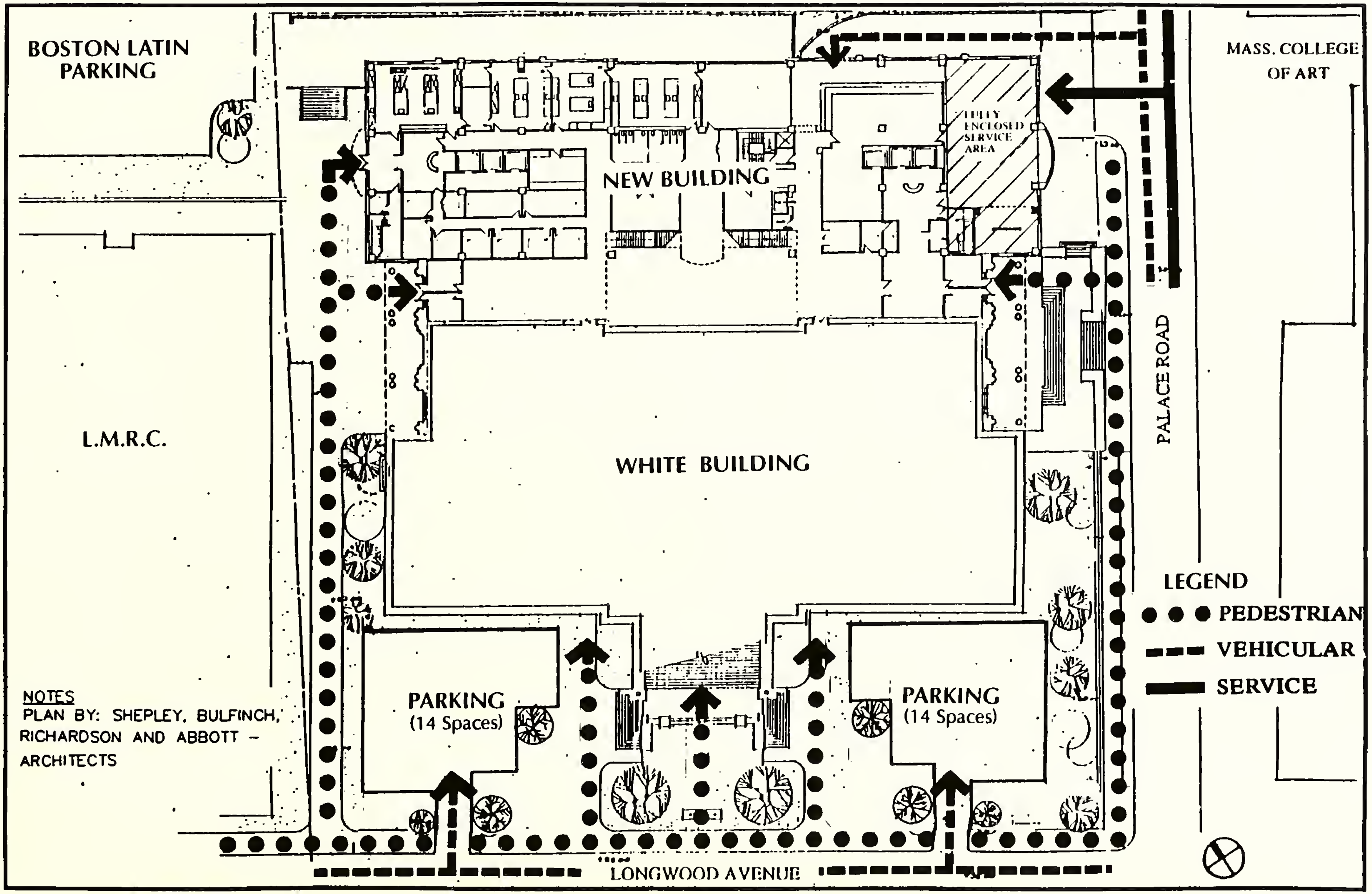


Figure V-2.4
Proposed Site Access
Massachusetts College of Pharmacy and Allied Health Sciences

In addition, the Research Facility will have a separate pedestrian entrance along the westerly side of the New Building, connected by a landscaped walkway to Longwood Avenue.

2.4 Off-Street Parking

The available parking on the Site will not exceed 124 spaces. Existing parking on the rear of the White Building will be relocated to the below-grade, one-level parking garage under the New Building, thereby reducing the number of existing surface parking spaces. The 50 parking spaces currently located in front of the White Building will be reduced to 28 spaces. Additional landscaping along Longwood Avenue will be installed to improve the aesthetics and pedestrian environment along Longwood Avenue in accordance with the BCDC approval for the Project. This split in parking (approximately 91 to 96 spaces below grade and 28 spaces in two surface lots) is the only economically feasible option for the College due to the high cost of dewatering and foundation construction. In addition, the College will cooperate with MASCO's efforts to identify additional parking outside the LMA.

2.5 Streetscape

The streetscape along Palace Road will be improved by the Project. The frontage on Palace Road between the White Building and the Boston Latin School property line is currently a blacktop surface parking lot without any landscape improvements. The Project will replace this parking lot with new entrance stairs, landscaping and terraces, vehicle-related pavement will be reduced to small driveway entrances and exits with the balance of the parking area consisting of attractive brick and masonry pavers. Parking will be below-grade and out of view, thus enhancing the appearance of a significant portion of Palace Road. This has been an important objective of the BRA and BCDC during their review of the Schematic Design plans for the Project.

2.6 Off-Street Loading Area

The off-street loading area will be located within the service level under the New Building thereby concealing delivery truck and service activities from Palace Road (see Figure V-2.5). Delivery trucks will enter and exit the loading area via Palace Road.

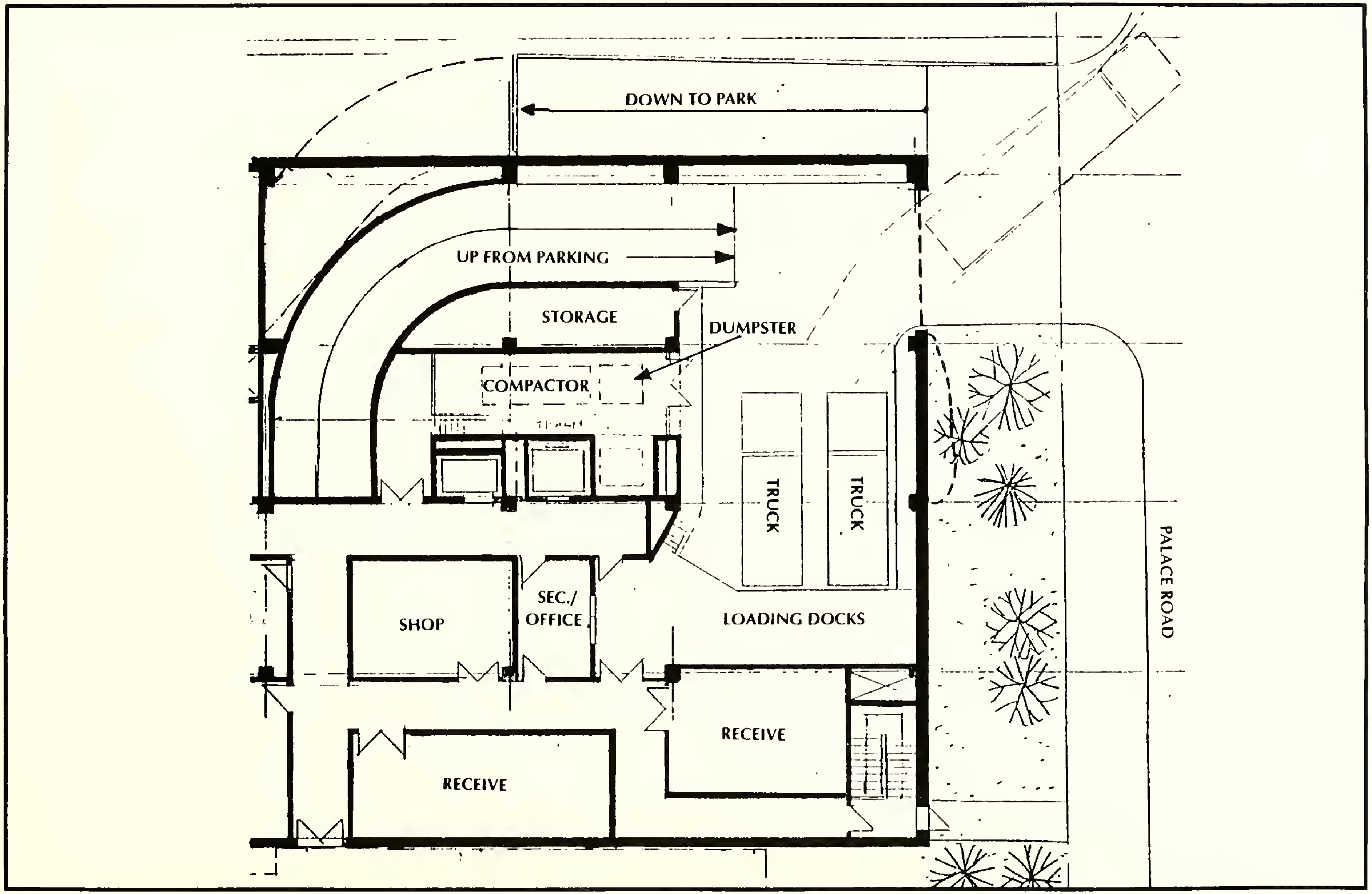


Figure V-2.5
Off-Street Loading and Service
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

6650 3/26/93

3.0 DRAWINGS/MODELS/SITE PHOTOGRAPHS

Reduced copies of the drawings, site photographs, and photographs of the study model are included herewith in Appendix F. These drawings include the following:

No.	Title	Scale	Date
-	Cover Sheet/Eye Level Perspective	-	2/19/93
L-1	Site Survey	-	-
L-2	Site Context Sections	1" = 60'	2/19/93
A-1	Site Plan	1" = 32'	5/21/93
A-2	Site Plan	1" = 20'	5/2193
A-3	Parking Level Plan	1" = 16'	5/21/93
A-4	Service Level Plan	1" = 16'	5/21/93
A-5	First Floor Plan	1" = 16'	5/21/93
A-6	Second Floor Plan	1" = 16'	5/21/93
A-7	Third Floor Plan	1" = 16'	5/21/93
A-8	Typical Wet Lab and Dorm Floor Plan	1" = 16'	5/21/93
A-9	Building Elevations	1" - 16'	5/21/93
A-10	Building Elevations	1" = 16'	5/21/93
A-11	Building Sections	1" = 16'	5/21/93

Other Material

Study Model	1" = 20' (separately provided to BRA)
Massing Model	1" = 100' (separately provided to BRA)
Site Photographs	Eight Photos of Existing Site and Neighborhood

4.0 SCHEDULE FOR DESIGN DEVELOPMENT MATERIALS

Design Development materials will be submitted to the BRA in early June, 1993.

VI. HISTORIC RESOURCES COMPONENT

VI. HISTORIC RESOURCES COMPONENT

1.0 INTRODUCTION

The BRA's PAD and the Secretary's Certificate determined that the Historical Resources Component of the DPIR/DEIR is sufficient to satisfy the scoping requirements. This section of the FPIR/FEIR provides a summary of the DPIR/DEIR's Historical Resources Component. A full discussion can be found in Section VI of the DPIR/DEIR.

2.0 SITE HISTORY

Subsequent to the completion of the White Building and the Garage/Office Building in 1917, the northern portion of the Site remained vacant until 1961. The Newton Building was completed in 1961. The only area remaining is used as a parking lot with some small landscaped areas.

3.0 CULTURAL RESOURCES IN THE PROPOSED PROJECT VICINITY

A review of Massachusetts Historical Commission's (MHC) files disclosed no archaeological sites within a one-half-mile radius of the College. A further review of MHC's and Boston Environment Department files was conducted to identify noteworthy buildings or sites in the Project vicinity.

The Boston Environment Department surveyed the LMA and the Fenway Area in 1983-1984. Survey forms for 14 buildings and/or institutions within the vicinity of the Site were completed. A survey form was filled out if the Site was notable for its architecture and for its local cultural and/or historical significance. The following noteworthy buildings were found on file:

- Simmons College Main Building
- Isabella Stewart Gardner Museum
- Wentworth Institute Building
- George Robert White Building
- Carlton, Westcourt, et al. Apartment Buildings
- Former Angell Memorial Animal Hospital
- Harvard School of Dental Medicine and Harvard School of Medicine
- Children's Hospital
- Vanderbilt Halls
- Brigham and Women's Hospital's Longwood Medical Research Center (formerly the Boston Lying-In Hospital)
- Boston Latin High School

4.0 ANALYSIS OF POTENTIAL EFFECTS

The Isabella Stewart Gardner Museum is the only one of the above referenced buildings listed in the National Register of Historic Places. The New Building will be slightly visible from the Gardner Museum, however, the New Building will not block any scenic views.

A review of environmental effects indicates that for the twelve shadow periods analyzed in the report, Alternative B (the "Project") will cast shadows only during the winter solstice at 3:00 PM on the Gardner Museum's southwest corner. In comparison to the other alternatives evaluated in Section I-2.0 of the DPIR/DEIR, the shadows cast from Alternative B are considerably less than those cast by Alternatives A or C on the Gardner Museum.

The Project is compatible in height, scale, massing, and exterior design to other buildings within the vicinity of the Project. Treatment of the rooftop mechanicals above the cornice line is being designed to further blend the New Building with the White Building. The selection of materials (brick and precast concrete) and their color have been carefully coordinated with the brick and limestone of the White Building. Architecturally, the design of the New Building will complement the existing White Building and is in character with the other noteworthy building in the LMA. From a cultural perspective the proposed medical and educational uses of the Project match the uses of other structures and institutions in the area. Massing of the New Building has been organized to center on the major axis of the White Building, thus reinforcing the design integrity of the White Building.

VII. INFRASTRUCTURE SYSTEMS COMPONENT

VII. INFRASTRUCTURE SYSTEMS COMPONENT

1.0 INTRODUCTION

This section updates the DPIR/DEIR Infrastructure System Component and responds to issues raised in comments on the DPIR/DEIR submitted by the BRA, BWSC, and others regarding the effect of the Project on the infrastructure serving the Site. For each infrastructure element or utility affected, this section will address the adequacy of the utility under existing and expected future local condition to accommodate increased demand created by the Project. This section will also address backup and emergency energy and electrical systems to the extent possible given the preliminary nature of Project's design plans.

The Project, when the cooling tower is in operation, will require approximately 66,860 gallons of water per day (gpd) on an average daily basis for process (heating and cooling) and domestic use. This amount drops to 46,860 gpd when the tower is not in operation. Average project wastewater discharge is expected to be approximately 42,600 gpd. This figure is greater than that reported in the DPIR/DEIR due to the inclusion of additional space in the service level which increase is off-set by slight reduction in the floor area of the Research Facility, but not sufficient to eliminate the increases from additional floor area to be used in the service level. It was assumed that approximately one half of the 29,865 gross square feet in the service level will have a water demand similar to laboratory space or approximately 200 gpd/1000 square feet. The remaining area is assumed to have no water use requirements. System connections for water supply will be to an existing water main under Palace Road. Wastewater will be discharged to a new sewer to be constructed under Palace Road. This new sewer to be constructed by BWSC will replace an existing sanitary sewer found by BWSC during routine inspections to be damaged.

Heating and cooling requirements will be supplied by two 500 hp gas fired boilers and a 1,000 ton chiller (wet cooling tower), respectively. Gas service will be supplied by Boston Gas. Electrical service will be supplied by Boston Edison.

2.0 SANITARY AND STORMWATER SEWER SYSTEM

2.1 Description of Existing Facilities

The BWSC, during the course of the Summer of 1993, plans to replace both sanitary and stormwater sewers on Palace Road, adjacent to the Project Site, found to be damaged. The BWSC has been contacted regarding Project connection location, and sewer capacity and has indicated that the Project's sanitary connection will be to an 18-inch pipe approximately as shown in Figure VII-2.1.

The BWSC has indicated that it will likely replace the damaged section of piping with a similarly sized pipe. However, because construction bids are not final at this time, the location of Project tie-in and sewer size are subject to some minor modification as sewer replacement review continues.

2.2 Project Wastewater Generation

The average Project wastewater discharge is expected to be 42,600 gpd. Peak wastewater generation is estimated to be 90 gpm, based on 314 CMR 7.15 guidance with a peaking factor of 3.

An additional 27 gpm will be generated during periods of cooling tower blowdown. These periods are expected to last for 2-3 minutes approximately once per week, and will only occur during summer months when cooling is required.

2.3 System Connection and Available Capacity

Connection to the storm drain system will be to a 15-inch pipe also as shown in Figure VII-2.1. The BWSC has also stated that the sanitary sewer and storm drain systems will have sufficient available capacity to service the Project.

6650SEW2 05-25-93

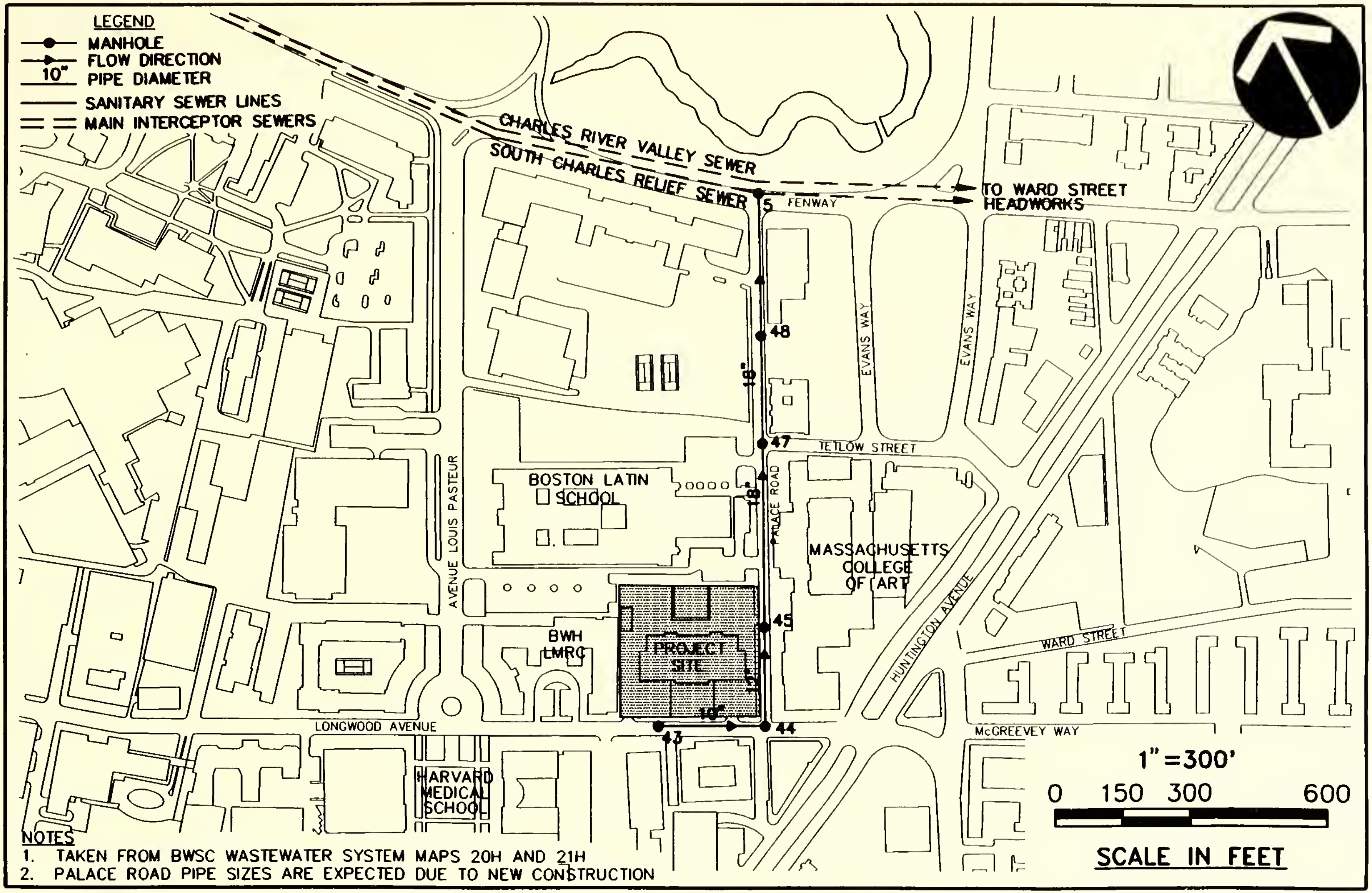


Figure VII – 2.1
Sanitary Sewer Routing
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.
A Summit Company

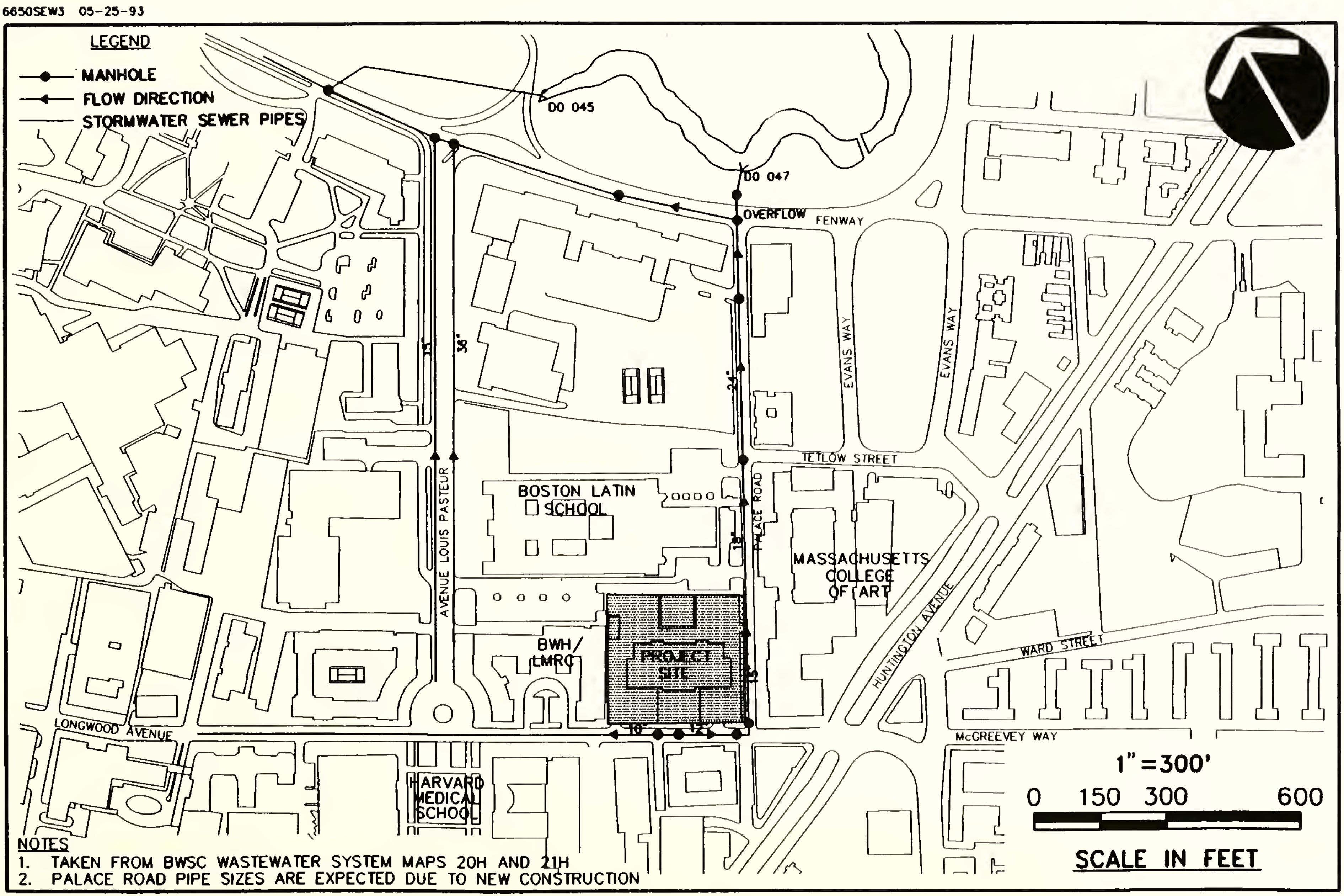


Figure VII - 2.2
Stormwater Sewer Routing
Massachusetts College of Pharmacy and Allied Health Sciences

3.0 WATER DISTRIBUTION SYSTEM

3.1 Description of Existing Facilities

The vicinity of the Project area is serviced by both low pressure (SLS) and high pressure (SHS) water mains. The SLS is generally used to meet both domestic and fire hydrant (street) demand. The SHS is used to supply water to the SLS system. While direct connection to the 42-inch SHS water main on Huntington Ave is not permitted, BWSC has indicated that indirect connection via the SLS mains on Huntington Ave would be permitted during fire emergencies.

3.2 Capacity of Existing Facilities

The BWSC schedules hydrant testing on a continuous basis. Tests are generally not performed out of schedule unless required or if prior tests indicate potential problems in an area. The BWSC has indicated that the water mains in the Project vicinity have sufficient available capacity, and are of suitable quality to service Project needs (see Attachment 1 at the end of this section of the report for notes of May 17,1993 telephone communication with BWSC). Figure VII-3.1 shows BWSC water mains in the Project area.

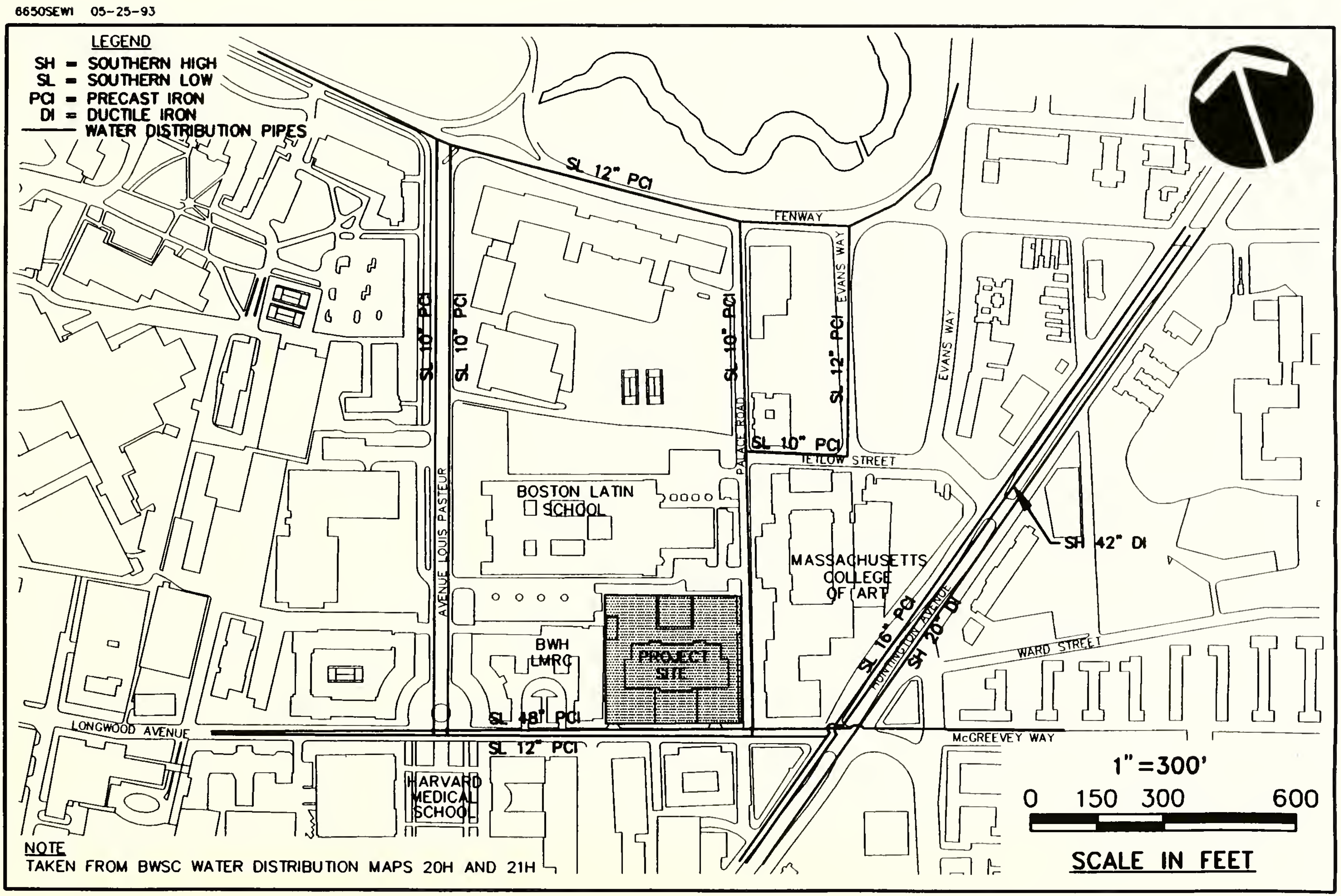


Figure VII – 3.1
Water Distribution
Massachusetts College of Pharmacy and Allied Health Sciences

HMM Associates, Inc.

4.0 ENERGY SYSTEMS

4.1 Energy Use Strategies

The current on-site natural gas-fired boilers will be replaced by new boilers for additional capacity to meet Project heating and hot water requirements. The boilers will be fired by natural gas and will generate low pressure steam. Steam condensate will be recycled for reuse in the heating system. Natural gas is to be supplied by Boston Gas via existing gas lines under Longwood Avenue or Palace Road.

Project cooling needs will be provided by a 1,000 ton chiller with a wet cooling tower to remove waste heat. The tower will not be operated when outside ambient temperature is less than approximately 55°F. Furthermore, draft fans will not be used when ambient temperature is moderate (approximately 55°F to 65°F). Blowdown, to maintain tower water quality, will be intermittent and is expected to be approximately 27 gpm for two minutes, usually once per week.

4.2 Electric Service

Electric service connection will be made to existing electric lines on Palace Road. A new electric transformer room will be located on the southwest corner of the New Building. The new transformer room will be designed according to Boston Edison's specifications to minimize any impacts to open space and pedestrian ways during installation.

Efforts to conserve energy and to reduce Site needs are currently being evaluated for final Project design. Compliance with the new State Building Code requirements, for such items as lighting and insulation, are expected to minimize electrical energy consumption.

Due to the preliminary nature of design, final electrical requirements are not established at this time. As final design progresses, this value may be updated. Based on current design, average electrical demand is forecasted to be 3,182,650 kW hours per year.

Boston Edison has indicated that sufficient available capacity is present to accommodate Project needs given the present area development and the expected future development.

4.3 Natural Gas Service

Natural gas for the main facility boilers and for the laboratory "point of use" boilers is to be provided by Boston Gas via existing gas lines under Longwood Avenue or Palace Road. Boston Gas has indicated that sufficient capacity is

available to meet the Project's needs given the present and the expected future area development. In addition, the Boston Gas Master Plan for future developments calls for the installation of a new main to service the LMA including the Project site.

Final gas requirements are not established at this time. Based on current design, average gas use is forecasted to be 21 x 10^9 Btu per year. As final design progresses, this value may be updated slightly.

5.0 COMMUNICATIONS

Connections to New England Telephone cables will be made to existing cables under Palace Road. The telephone switch room will be located in the northwest corner of the New Building with the electric transformers. Details of the proposed modifications and implementation schedules will be coordinated throughout design and construction with New England Telephone.

New England Telephone has indicated that sufficient capacity exists to accommodate Project needs given the present and the expected future development of the area.

ATTACHMENT 1

PHONE CALL/MEETING SUMMARY SHEET

DATE: May 17, 1993

DISTRIBUTION:

HMM PROJECT NO: 6650-702

CLIENT/PROSPECT COMPANY NAME: Massachusetts College of Pharmacy and Allied Health Sciences

NAME OF CONTACT AND TITLE: Boston Water & Sewer Commission - John Sullivan, Chief Engineer

TELEPHONE NO:

NOTES:

- Sanitary and storm sewer under Palace Road to be replaced this summer. Likely to be on a size for size basis. There is no need to increase capacity. BWSC feels that there is plenty of capacity available for project needs.

- City found that present pipe had collapsed. Therefore, it needed to be replaced. It is not being replaced to increase capacity.

- Bids for construction are to go out this week.

- BWSC does not allow direct tie-in to High Pressure Service water mains. However, because of the proximity of the SHS line to the project, there is plenty of water available

- There are no known poor condition pipes in water service lines in the project proximity.

ACTION: ☐

☐

☐

☐

☐

Eric R Hooper

Signature

HMM ASSOCIATES, INC.

ENGINEERS. ENVIRONMENTAL CONSULTANTS & PLANNERS

VIII. RESPONSE TO COMMENTS ON THE DPIR/DEIR

VIII. RESPONSE TO COMMENTS ON THE DPIR/DEIR

This section of the FPIR/FEIR has been prepared to respond to the comments on the DPIR/DEIR.

Reproductions of the BRA's Preliminary Adequacy Determination, the Secretary's Certificate, and comment letters are provided. The margins of each correspondence have been labeled with numbers referring to the response number. Following each correspondence, the numbered comments are restated with a response and reference to the section of the FPIR/FEIR which more fully responds to the comment, if appropriate.

The correspondence discussed in this Section include:

1.0 BRA Preliminary Adequacy Determination on the DPIR, Boston Redevelopment Authority, May 21, 1993

2.0 Secretary's Certificate on the DEIR, Executive Office of Environmental Affairs, May 14, 1993

3.0 Department of Environmental Protection, Division of Air Quality Control, May 7, 1993

4.0 Harvard Medical School, May 6, 1993

5.0 City of Boston Environment Department, May 3, 1993

6.0 Executive Office of Economic Affairs, May 7, 1993

7.0 Massachusetts College of Art, May 4, 1993

8.0 Massachusetts Bay Transportation Authority, April 29, 1993

9.0 Boston Water and Sewer Commission, May 7, 1993

10.0 Building and Construction Trades Council of the Metropolitan District, May 3, 1993

1.0 BRA PRELIMINARY ADEQUACY DETERMINATION ON THE DPIR, BOSTON REDEVELOPMENT AUTHORITY, MAY 21, 1993

Letter from: Beverley Johnson, Assistant Director for Institutional Planning and Development

The BRA's Preliminary Adequacy Determination on the DPIR requests additional information for its review of the Project. This information is provided within the FPIR/ FEIR as requested in order for the BRA to issue a Final Adequacy Determination on the Project.

Boston Redevelopment Authority

1.0

May 21, 1993

Mr. Louis P. Jeffrey
President
Massachusetts College of Pharmacy
and Allied Health Services

Dear Mr. Jeffrey:

Re: Research/Dormitory College Facility Project

A. Article 31 Development Review: Preliminary Adequacy Determination

This letter is the Preliminary Adequacy Determination (the "Determination") of the Boston Redevelopment Authority (the "BRA") with respect to the Draft Project Impact Report (the "DPIR") for the proposed Research/Dormitory College Expansion Project (the "Proposed Project").

The BRA is issuing this Determination pursuant to the development review requirements of Section 31-5 of the Boston Zoning Code (the "Code"), and as presented by the Institutional Master Plan documentation requirements as defined by Article 51-31.

This Determination requests additional information required by the BRA for its review pursuant to Article 31. Article 31 of the Code, Development Review Requirements, sets out a comprehensive procedure for project review, and requires the issuance of a Final Adequacy Determination prior to issuance of a building permit. The Final Adequacy Determination is issued upon determination by the BRA that the Final Project Impact Report (the "FPIR") is satisfactory.

B. Institutional Master Plan: BRA Comments

Also enclosed are the BRA's comments on the sufficiency of the draft Institutional Master Plan for the Massachusetts College of Pharmacy and Allied Health Sciences and the description of the Proposed project, as contained therein.

In an effort to standardize Institutional Master Plans, the BRA is using the Institutional Master Plan provisions of Article 51 as a standard for the content and documentation required for Institutional Master Plans. These provisions set out in a manner similar to the Article 31 process the necessary review steps including issuance of an Adequacy Determination by the BRA.

But for the required corrections, clarifications, and additional information referenced in the attached Technical Appendix, the DPIR submitted is sufficient to satisfy the scoping requirements of Article 31.

We look forward to reviewing the Final Project Impact Report and the revised Institutional Master Plan.

Sincerely,

Beverley Johnson
Assistant Director for Institutional
Planning and Development

TECHNICAL APPENDIX
TO THE
PRELIMINARY ADEQUACY DETERMINATION
FOR
MASSACHUSETTS COLLEGE OF PHARMACY
RESEARCH/DORMITORY/COLLEGE FACILITY PROJECT

DEVELOPMENT REVIEW REQUIREMENTS - ARTICLE 31

Article 31 of the Code institutes a process by which large-scale development projects will be reviewed by the BRA. In its review of the DPIR, the BRA has identified certain components which are insufficient and which the proponent must modify, and additional information which the BRA requires in order to issue a Final Adequacy Determination. The following is a description of the sufficiency of the materials submitted in the DPIR, and the additional materials which the Proponent must include in the FPIR.

I. GENERAL INFORMATION

The general information provided in the DPIR is sufficient to satisfy the scoping requirements with the exception of the presentation on the alternatives, public benefits and financial data.

3.0 Financial Information

Prior to consideration of this project by the Authority, the proponent should submit the financial information requested pertaining to Development and Operating costs. 1.1

3.4 Evaluation of Alternatives

The analysis of the alternatives and their relationship to the zoning requirements would be improved with the inclusion of a table. This matrix would clearly show that the preferred alternative most clearly approximates the zoning requirements. It would also indicate how some of the more important constraints in zoning, such as FAR and height, are not being violated by any of the alternatives. 1.2

5.0 Public Benefits

The discussion of public benefits focuses to a large extent on current activities being undertaken by the College. A number of new employment and housing related initiatives were presented to the May 4th meeting of the Mission Hill PZAC. These initiatives should be discussed in the Final Project Impact Report. 1.3

II. TRANSPORTATION COMPONENT

The information provided in the DPIR with respect to circulation is sufficient to satisfy the scoping requirements. Given the amount of analysis of area conditions which is already available, the BTD takes the position that further analysis of the five study area conditions is not necessary.

Parking, construction impacts, pedestrian and bicycle circulation need, on the other hand, to be addressed further.

The BTD is currently drafting a Transportation Access Plan ("TAP") Agreement for execution between the City of Boston and the Proponent. A TAP Agreement must be substantially finalized prior to the formal issuance of an Adequacy Determination by the BRA.

With respect to parking, the petitioner has identified an existing auto model share of 63% for the College/ Channning Laboratory employees and 30% for students and a auto occupancy ratio of 1.0. With mitigation the petitioner has proposed an employee auto model share goal of 45% and increased auto occupancy of 1.15 for all users. These goals are ambitious but necessary. A number of strategies including employee transit subsidies, implementation of parking fees and a commuter mobility program are proposed in order to reduce by 37% the number of employees who will drive, from 193 employees to 122, and the number of students who need parking from 179 to 155 (a 13% reduction). Given the limited supply of parking, on the other hand, this mitigation program falls 127 spaces short of the projected supply of a maximum of 150 spaces.

In order to understand the adequacy of and the College's commitment to a proposed mitigation program, the number of students and employees who will be affected by the various proposed mitigation strategies should be identified. In carrying out this analysis, a number of issues need to be identified.

First, the analysis of employees should address mitigation strategies separately for the College and the Channing Lab employees. The commuting patterns for these employees are clearly different. In addition, Channing laboratory employees may be able to continue to park in the Harvard garage. The analysis should therefore separately set forth the auto share and VOR goals for the two classes of employees and the mitigation measures that will be brought to bear on each.

The analysis of student parking demand, furthermore, indicates a demand for spaces which is far in excess of supply. The survey showed that 179 students need parking but that the College will have no more than 50 spaces for the students. Given this shortfall, it would seem appropriate to first identify where the students are parking and second, establish a goal for auto use which is below the 30% current demand estimate. Third a mitigation program which focuses at getting the students to live

nearby, utilize bicycles and to make greater use of public transit should be designed. Specific commitments to reach these and other strategies should be identified. The provision of locker changing facilities and bicycle storage in a secure area should at a minimum be provided.

In order to understand how the proposed mitigation measures will diminish the demand for parking, mode splits (disaggregated by college facility, staff, and administration and channing labs) should be presented for both the unmitigated situation (consistent with Tables III-3.2, III-3.3, and III-3.4) and the mitigated situation. The contribution of each mitigation measure to the change in modal split for each trip maker category should be shown. Mitigation strategies should detail proposed rate structures, transit subsidy percentages and provisions for preferred spaces. 1.7

Construction impacts will affect the parking supply as well as pedestrian circulation to Boston Latin. No mention has been made of how the College proposes to address this interim short fall of spaces as well as the impacts upon pedestrian circulation. 1.8

The need to provide an adequate pedestrian and bicycle system to and from the College has been clearly stated in the DPIR. Pedestrian counts will be undertaken to clarify desire lines and the adequacy of the existing circulation system. Improved access to Avenue Louis Pasteur and Longwood Avenue for pedestrian and bicycles both during and after the construction phases should be analyzed. Various alternatives need to be considered and wherever possible adopted. 1.9

III. ENVIRONMENTAL COMPONENT

The information and analysis provided in the DPIR concerning environmental impacts of the Proposed Project are sufficient to satisfy the scoping requirements with the exception of the following:

1.0 <u>Qualitative Assessment of Pedestrian Level Winds</u>

General: In general, the pedestrian level wind analysis indicates that with the new building, wind conditions will be satisfactory and there should be no exceedences of BRA standards. The major areas of increased windiness are expected to be at the northwest end of the New Building, near the north corner, and at the southeast side of the New Building, near the east corner, where winds uncomfortable for walking may occur. Also, wind conditions degrade along the westerly portion of the Boston Latin School walkway with southwest winds, but since these generally are summer winds, the effect would not necessarily be unpleasant. The DPIR/DEIR notes that landscaping will be planted to reduce winds at the north and east corners of the New Building and at other locations. The FPIR/FEIR should provide more detail on the landscaping mitigation plan (type of 1.10

vegetation, etc.) and should include a plan indicating the location of the vegetative plantings.

In section 1.5.1, under Existing Conditions, it should be noted that the area between the White Building and the Newton Building also is quite windy (northwest winds). 1

2.0 Shadows

General: The shadow analysis indicates that the principal areas affected by new shadows will be the walkway between the project site and the Boston Latin School (primarily from midday on), sections of Palace Road in the afternoon, and the eastern portion of the southerly facade of the Boston Latin School (most particularly in the winter after 3 P.M. when the Latin School students have left). The latter is probably the most serious impact, although the proposed project does generally produce the least impact of the alternatives evaluated. The facade shading diagrams (Figs. IV-2.14 through IV-2.16) clearly represent this impact and are a good presentation.

3.0 Daylight

General: The Daylight Study (IV-3) presented in the DPIR is thorough and meets the requirements of the scope. It is clear that the project, as proposed, is not significantly worse than as-of-right zoning envelopes would allow. The mechanical level should be set back from the building facade plane so that it is not visible from (and therefore would not impact daylight upon) the Boston Latin School walkway. 1

4.0 Air Quality Analysis

General: A plan indicating the locations of the garage vents and receptor locations for the garage exhaust analysis should be provided in the FPIR/FEIR. 1.

4.3 Space Heating and Steam Facilities

The new boilers will emit considerable amounts of nitrogen oxides, although below State and EPA defined significance levels. Nonetheless, NO_x is a precursor of ozone, for which Massachusetts is in non-compliance. The Clean Air Act Amendments require Massachusetts to attain ozone standards by 1999, which, in turn, will require substantial reductions in NO_x and VOC emissions. Therefore, the FPIR/FEIR should identify State regulatory requirements for the boilers, as well as measures that will be utilized to obtain DEP approval and minimize the emission of NO_x to the maximum extent feasible. 1.1

7.0 Geotechnical

7.2 Geotechnical Effects from the Project

The DPIR/DEIR indicates that both the White Building and the LMRC will be underpinned prior to excavation. The FPIR/FEIR should indicate whether there also will be a need to underpin the Boston Latin School adjacent to the project site and if not, the basis for this determination. 1.15

IV. URBAN DESIGN COMPONENT

General: The information presented in the DPIR, together with the submission of required schematic documents and supplemental documents, are adequate except for the items listed below which must be addressed in the FPIR which shall also include design changes made since the submission of the DPIR which have resulted from the ongoing BRA and community review process.

A. A landscape design for the front yard (along Longwood Avenue) which maximizes the amount of green space, minimizes car parking area and the number of parked cars, and improves the visual quality of materials in the parking area was approved on May 4th by the BCDC. This plan should be included in the FPIR/FEIR (see also Wind comments above). 1.16

B. The floor plans that were included were not fully legible. Clearer plans should be provided in the FPIR/FEIR. 1.17

V. HISTORIC RESOURCES COMPONENT

The information provided in the DPIR concerning historic resources is sufficient to satisfy the scoping requirements.

VI. INFRASTRUCTURE SYSTEMS COMPONENT

The information provided in the DPIR concerning infrastructure systems is sufficient to satisfy the scoping requirements, but for the following information which the FPIR must include:

General: The DPIR/DEIR provided estimates of the capacity of the existing sewer and water facilities and of the project's anticipated sewage generation and water demand, but there was no analysis of the adequacy of these utilities under either existing or future local load conditions to accommodate the projected demand. This information must be provided for the FPIR/EIR. 1.18

The analysis of energy and electrical demands, including quantification, of the project should also be augmented. Backup and emergency systems should be discussed in the FPIR. These assessments should be included in the FPIR/FEIR. 1.19 1.20

2.4 System Connections

It is stated that sanitary sewage service from the New Buildings will be connected to the "existing 15-inch sewer under Palace Road". However, Fig. VII-2.1 shows a line of 12-inch and 18-inch diameter in Palace Road. Clarification or correction is needed. 1.21

3.1 Water Distribution System: Description

The age and condition of the SLS water mains are cited as concerns arguing against testing. Has their age made the mains weak? Has scaling of the precast iron diminished their actual (vs. theoretical) capacity? The project proponent should discuss these concerns with BWSC and propose mitigation, if appropriate. A report should be made in the FPIR. 1.22

3.4 System Impacts

It is noted that the existing SHS water system is capable of meeting the fire fighting requirements of the project. Yet Fig. VII-3.1 does not show any SHS lines in the vicinity of the project site (only SL lines). Clarification or correction is needed. 1.23

VII. AGREEMENTS

In addition to completing the Development Review Requirements process, the agreements, plans and documents listed below must be provided in form and content satisfactory to the appropriate signatory public agencies before building permits may be issued for the project: 1.24

A. Transportation Access Plan (TAP) Agreement;

B. Traffic Maintenance Plan in conformity with the City's Construction Management Program;

C. Boston Residents Construction Employment Plan, pursuant to Chapter 12 of the Ordinances of 1986 of the City of Boston, as amended by Chapter 17 of said Ordinances, and Executive Order Extending Boston Residents Job Policy, signed by the Mayor on July 12, 1985; and

D. First Source Agreement with the Mayor's Office of Jobs and Community Services.

E. Development Impact Project Agreement pursuant to Article 26-26B of the Zoning Code.

F. Cooperation Agreement.

1.1 *Submission of financial information requested pertaining to development and operating costs.*

Response:

The requested financial information will be provided to the BRA.

1.2 *Inclusion of a Table on Alternatives Analysis.*

Response:

Table I-2.1, "Summary of Alternatives Analysis and Comparisons to Existing Zoning Requirements", is provided in Section I-2.0 of the FPIR/FEIR. This table shows that Alternative B (the Preferred Alternative) most clearly approximates the zoning requirements.

1.3 *New Public Benefits should be discussed in the FPIR.*

Response:

The Public Benefits Section has been updated to include additional public benefits discussed at the May 4, 1993 Mission Hill PZAC meeting. Please refer to Section II-5.0 of the FPIR/FEIR.

1.4 *Address parking, construction impacts, pedestrian and bicycle circulation.*

Response:

The FPIR/FEIR includes an entirely new Transportation Component which responds to the BRA's comments, including an analysis of pedestrian impacts and commitment to provide bicycle storage areas in the New Building.

1.5 *Finalized TAP Agreement.*

Response:

The Boston Transportation Department has issued a draft of a TAP Agreement for review by the College, which includes mitigation measures for the Project. The College is currently reviewing the TAP Agreement with BTD. A TAP will be executed by the College prior to the issuance of a building permit for the Project.

1.6 *Student Parking Demand and the College's Commitment to Transportation Mitigation.*

Response:

As noted in the Transportation Element of the FPIR, the College's students are parking either in commercial off-street spaces or in on-street spaces in or near the LMA. Because of the flexible schedules of the students, many of whom work and live outside the City, a 30% auto use is not an unreasonable goal to achieve. Transportation Mitigation measures the College is committed to include: reduction in total on-campus parking, cooperation with MASCO on roadway improvements and demand measurement measures as discussed in Section III-4.3 of the FPIR/FEIR.

1.7 *Detail Transportation Mitigation Measures and Strategy.*

Response:

The FPIR/FEIR contains proposals for transit subsidies rates and measures to meet proposed modal shares. A proposed parking fee structure has not yet been set by the College, but the rates will be consistent with other LMA institutions. See Section III-4.3 of the FPIR/FEIR for additional detail on mitigation measures.

1.8 *Construction impacts on parking supply and pedestrian circulation to Boston Latin School.*

Response:

The College will cooperate with MASCO in its efforts to identify parking spaces outside the LMA. In addition, the College's shortfall in spaces will be addressed through the College's Commuter Mobility Plan. The College's Construction Staging Plan (see Section

III-10.5) is designed to protect pedestrian movement in the vicinity of the Project during construction.

1.9 *Adequate pedestrian and bicycle systems to and from the College.*

Response:

A detailed pedestrian analysis is included within the FPIR/FEIR. The College will provide a protected bicycle storage area and lockers to facilitate bicyclists.

1.10 *Landscaping mitigation plan to reduce wind effects (type of vegetation, etc.) should be provided.*

Response:

The landscaping plan is presented in Figure IV-2.8 of the FPIR/FEIR.

1.11 *Northwest winds in the area between the White Building and the Newton Building.*

Response:

The windy conditions on the site due to the northest winds will be eliminated following construction of the Project.

1.12 *The mechanical level set back to reduce daylight impact the Boston Latin School walkway.*

Response:

There is no feasible means to further set back the mechanical level from the Latin School. Any change on daylight obstruction due to construction of the Project will be minimal due to the fact that the mechanicals are only partially visible from the Latin School walkway.

1.13 *Location Plan for garage vents and receptor locations for garage exhaust analysis.*

Response:

A plan indicating the location of the garage vents at the north corner of the Project, as well as nearby receptor locations for the garage exhaust analysis is provided in FPIR/FEIR as Figure IV-5.4.

1.14 *State regulatory requirements for the boilers measures utilized to obtain DEP approval and minimize emission of NO_X.*

Response:

Title I of the Clean Air Act (1990) requires that states consider NO_X as a precursor pollutant in the formation of ozone. Massachusetts is located within the interstate ozone transport region from northern Virginia to Maine, and is regulated as a non-attainment area. Massachusetts falls within the serious category and, therefore, any new source with NO_X emissions of greater than 50 tons per year is considered major and subject to the non-attainment provisions. The potential NO_X boiler emissions are 17.5 tons per year (assuming both boilers operating 8,760 hours per year) and well below the 50 tons per year threshold. The Project, therefore, does not require non-attainment review. (Note that actual operational emissions are likely to be less than the potential levels shown since units typically do not operate non-stop over the course of a year. Further, only one boiler is generally used at a time.) As noted in the air quality study, however, the Project will still require non-major Comprehensive Plan Approval from the Massachusetts DEP (if the units have a total rating of 40 MMBtu/hr) or Limit Plans Approval (if the units have a total rating less than 40 MMBtu/hr). Either process will require the Project to conduct a control technology analysis, referred to as BACT (Best Available Control technology), to ensure sufficient controls are applied to minimize emissions of all pollutants including NO_X. The smaller type units proposed are designed with burners which reduce flame temperatures and thereby reduce NO_X emissions. Further, based on expected BACT criteria, the project boilers will also likely be required to include induced flue gas recirculation to control NO_X emissions. Flue gas recirculation is a control measure which returns hot boiler exhaust to the burner. The process allows for a cooler flame which in turn reduces NO_X emissions.

1.15 *Need to underpin the Boston Latin School during construction.*

Response:

Due to the Boston Latin School's distance from the Project Site, underpinning of Boston Latin will not be necessary. A detailed discussion of geotechnical aspects is provided in Section 8.0 of the FPIR/FEIR.

1.16 *Landscape design for the front yard along Longwood Avenue.*

Response:

The College has modified its design of the parking lots along Longwood Avenue as approved by BCDC on May 4, 1993 and the BRA on May 27, 1993. The modified design includes an improved landscaping plan; attractive pavers substituting for asphalt; and a parking decrease in total on-site surface spaces from 50 to 28 spaces.

1.17 *Legibility of the floor plans.*

Response:

New floor plans have been included in Appendix F of the FPIR/FEIR.

1.18 *Adequacy of utilities.*

Response:

Boston Gas, Boston Edison, New England Telephone, and BWSC personnel have been contacted in regard to the Project and its effect on available capacity. None of the utility representatives expressed reservations concerning existing or future load conditions and the adequacy of the utilities. (See Section VII-2.3 and VII-3.2 of the FPIR/FEIR for additional discussion.)

1.19 *Energy and electrical demands analysis.*

Response:

Due to the preliminary nature of design, final electrical and natural gas requirements are not established at this time. As the final design progresses, these values may be updated. Based on current design, average electrical demand is forecasted to be 3,182,650 kW hours per year. Average energy requirement is forecasted to be 21 x 10^9 Btu per year.

1.20 *Discussion of backup and emergency systems.*

Response:

Emergency backup for electricity will be provided by a 1,500 kW diesel generator. This generator will be operated as a pure standby unit.

1.21 *Clarification of sanitary sewage service connection from the New Building.*

Response:

Connection will be made to the 18-inch sanitary sewer under Palace Road. Figure VII-2.1 is corrected to show this connection.

1.22 *Condition of the SLS water mains.*

Response:

BWSC conducts hydrant testing according to an internal schedule unless specific problem areas are suspected. The Project engineers have consulted with BWSC and the condition of the pipes in the vicinity of the Project are reported to be adequate. BWSC also indicated that there are no capacity problems in the Project vicinity.

1.23 *SHS lines in the vicinity of the Project site.*

Response:

Two southern high pressure lines run under Huntington Avenue. While direct connection to these lines will not be permitted, indirect access via the low pressure mains will assure

sufficient water pressure for fire fighting requirements. See Section VII-3.0 of the FPIR/FEIR.

1.24 *Completion of agreements, plans and documents listed below:*

A. Transportation Access Plan (TAP) Agreement

B. Traffic Maintenance Plan in conformity with the City's Construction Management Program

C. Boston Residents Construction Employment Plan, pursuant to Chapter 12 of the Ordinances of 1986 of the City of Boston, as amended by Chapter 17 of said Ordinances, and Executive Order Extending Boston Residents Job Policy, signed by the Mayor on July 12, 1985

D. First Source Agreement with the Mayor's Office of Jobs and Community Services

E. Development Impact Project Agreement pursuant to Article 26-26B of the Zoning Code.

F. Cooperation Agreement

Response:

All of the above Plans or Agreements will be executed by the College and the appropriate public agencies before issuance of the building permit(s) for the Project.

2.0 SECRETARY'S CERTIFICATE ON THE DEIR, EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, MAY 14, 1993

Letter from: Trudy Coxe, Secretary, Executive Office of Environmental Affiars

The Secretary commented that the DEIR generally responds well to the issues raised in the EOEA Scope of March 11, 1993, with areas of the DEIR warranting further attention in the FEIR as discussed in the Certificate and in comments from the Boston Environment Department, Department of Environmental Protection (Division of Air Quality Control), and the MBTA.

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street, Boston, 02202

WILLIAM F. WELD
GOVERNOR

ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR

TRUDY COXE
SECRETARY

2.0

May 14, 1993

Tel: (617) 7
Fax: (617) 7

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Massachusetts College of Pharmacy & Allied Health Sciences Project
PROJECT LOCATION	: Longwood Avenue, Boston
EOEA NUMBER	: 9309
PROJECT PROPONENT	: MA College of Pharmacy & Allied Health Sciences
DATE NOTICED IN MONITOR	: April 7, 1993

The Secretary of Environmental Affairs herein issues a statement that the Draft Environmental Impact Report (DEIR) submitted on the above project adequately and properly complies with the Massachusetts Environmental Policy Act (G. L., c. 30, s. 61-62H) and with its implementing regulations (301 CMR 11.00).

The proposal involves constructing approximately 187,000 square feet (s.f.) of new space to be used for research (~67,000 s.f.) and academic/dormitory uses (~100,000 s.f.). The bulk of the new space will be contained in an eight story building at the rear of the site, across the street from Boston Latin High School. In addition, a one level underground garage for 80-100 cars will be provided and the plan includes demolishing two existing buildings of no historical consequence.

The DEIR has been distributed in accordance with requirements under MEPA and as a Draft Project Impact Report (DPIR) under Article 31 of the Boston Zoning Code.

Generally the report responds well to issues raised in the Scope. However, there are areas of the report that warrant further attention in the Final Environmental Impact Report (FEIR) as are discussed below and in comment from the Boston Environment Department; the Department of Environmental Protection, Division of Air Quality Control; and the MBTA.

Alternatives Analysis

The DEIR demonstrates that an alternative massing scheme has been considered that would have less impact on the Boston Latin School in accordance with the Scope. This alternative has been suggested as having a dramatically greater visual impact from Longwood Avenue than would the preferred alternative. The preferred alternative (Alternative B, depicted in Figure I-3.9), 2.1
and the alternative prepared in response to the Scope (Alternative C, Figure I-3.12) are actually hard to compare because the level of detail provided is not comparable in each rendering. Thus, the FEIR must provide an architectural rendering of Alternative C with more detail similar to that found in Figure 1-3.9.

This request for additional detail is made solely for the purpose of providing a fair comparison of alternatives. I recognize that the limited shadow mitigation gained by Alternative C may not be sufficient to overcome the increased wind impacts and programmatic negatives associated with this alternative. I am nonetheless concerned that the suggested negative visual impact of Alternative C may be overstated.

Traffic

Further mitigation measures related to traffic will need to 2.2
be developed and described in the FEIR. The FEIR must clearly 2.3
depict the number of parking spaces associated with the project. Consider providing a net decrease in the total number of parking spaces on the site as has been discussed in comments and as is alluded to in the DEIR. Develop other possible ways to enhance 2.4
the Transportation Demand Management strategies provided in the DEIR.

Air Quality

2

Address concerns of the Division of Air Quality Control for the air quality analysis and the mitigation in the FEIR.

May 14, 1993
DATE

Trudy Coxe
Trudy Coxe, Secretary

Comments received :

Department of Environmental Protection, DAQC, May 7, 1993
Boston Environment Department, May 3, 1993
Massachusetts Bay Turnpike Authority 4/29/93
Harvard Medical School 5/6/93
Executive Office of Economic Affairs 5/7/93
Massachusetts College of Art 5/4/93
Boston Water and Sewer Commission 5/7/93
Building and Construction Trades Council of the Metropolitan
District 5/3/93

2.1 *The FEIR should provide an architectural rendering of Alternative C with more detail similar to that found in Figure I-3.9 of the DPIR/DEIR.*

Response:

A more detailed rendering of Alternative C has been provided in the Summary of Project Alternatives provided in Section I-2.4 of the FPIR/FEIR.

2.2 *Develop further traffic mitigation measures.*

Response:

The key to the Project's mitigation plan is decreasing single occupancy vehicle use by the College's faculty and staff from a current 78% to 30% rate. In addition, the College will implement a Commuter Mobility Plan, in cooperation with MASCO, to increase ridesharing to 15%. The overall goal of the College will be to achieve a vehicle occupancy rate of 1.26 for College faculty and staff, and 1.15 overall (including students). See Section III-4.0 of the FPIR/FEIR for a detailed description of proposed mitigation measures

2.3 *Clarify the number of parking spaces associated with the Project.*

Response:

The College currently has 150 at-grade parking spaces located on-site. The Project includes a below-grade garage under the New Building. The garage will contain approximately 91 to 96 spaces, to partially replace 100 of the at-grade spaces currently located behind the White Building. The 50 at-grade spaces, located within the two lots in front of the White Building, will be reduced to 28 spaces in accordance with approvals by the BCDC and the BRA. Total on-site parking will thereby be reduced from 150 spaces to no greater than 124 spaces. In addition, the College will also cooperate with MASCO's efforts to provide additional parking outside the LMA.

2.4 *Further develop Transportation Demand Management (TDM) strategies.*

Response:

The College has already begun the process of implementing the TDM strategies. See Section III of the FPIR/FEIR for additional discussion of TDM Strategies.

2.5 *Respond to concerns of DEP's Division of Air Quality.*

Response:

Please see responses to Comment Letter 3.0 from DEP's Division of Air Quality Control.

3.0 DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF AIR QUALITY CONTROL, MAY 7, 1993

Letter from: Christine Kirby, DEP

Ms. Kirby recommends conducting a microscale analysis using suggested DEP criteria. Ms. Kirby also stresses the need for mitigation measures at the intersection of Brookline Avenue/Longwood Avenue.

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

William F. Weld
Governor
Daniel S. Greenbaum
Commissioner

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MEMORANDUM

TO: Secretary Coxe, Executive Office of Environmental Affairs

ATTN: Jacki Wilkins, MEPA

FROM: Christine Kirby, DEP

DATE: May 7, 1993

SUBJECT: EOEA No. 9309 - Review of the DEIR for the Massachusetts College of Pharmacy and Allied Health Sciences in Boston

The Department of Environmental Protection (DEP) Division of Air Quality Control has reviewed the Draft Environmental Impact Report (DEIR) for the Massachusetts College of Pharmacy and Allied Health Sciences in Boston and offers the following comments. The
DAQC recommends using background CO values are 5 ppm for the one 3.
hour scenario and 3 ppm for the eight hour scenario when conducting a microscale analysis. The data provided for the 1998 build
scenario indicates that mitigation will be needed to ameliorate CO 3
exceedances at sensitive receptors B4,B5 and B7 located at the intersection of Brookline/Longwood Avenue. Mitigation can be achieved by implementing principles of Transportation Demand Management (TDM) such as providing transit passes for students and employees and instituting an employee ridesharing program.

Should you have any questions regarding this memorandum please contact Keith Grillo of the Division of Air Quality Control at 292-5630 ext. 5773.

3.1 *DAQC recommends using background CO values of 5 ppm for the one-hour scenario and 3 ppm for the eight-hour scenario when conducting a microscale analysis.*

Response:

Based on discussions with the DEP, the air quality analysis was revised to include DEP's existing CO background levels of 5.0 ppm for the one-hour averaging period and 3.0 ppm for the eight-hour averaging period. For the future year (1998), these values were scaled using the standard method of accounting for future year traffic growth and motor vehicle emission reductions. Consistent with the traffic analysis, a 1% per year growth factor was used. In addition, MOBILE4.1 idle mode emission results demonstrate an approximate 36% reduction in motor vehicle emissions from 1993 to 1998. Scaling the above 1993 background levels by these factors provides 1998 values of 3.4 ppm and 2.0 ppm for the one- and eight-hour averaging periods. Using these background values, revised results are provided in the air quality section of the FPIR/FEIR. In all cases, exceedances which occur under existing conditions will improve to acceptable levels in the future No Build condition and following construction of the Project.

3.2 D*ata provided for the 1998 build scenario indicates that mitigation will be needed to ameliorate CO exceedances at sensitive receptors B4, B5, and B7 located at the intersection of Brookline/Longwood Avenue.*

Response:

The data provided in both the DPIR/DEIR and FPIR/FEIR indicate existing 1993 exceedences of the 8-hour CO standard at the Brookline/Longwood intersection. The study results, however, demonstrate air quality levels in 1998, with construction of the project, will improve so that no exceedences occur. There are a number of mitigation measures proposed. These include reduction in overall trip generation through a Commuter Mobility Plan (e.g., transit subsidies for employees and employee ridesharing), and in working closely with MASCO in its ongoing program to improve traffic flow in the LMA.

4.0 HARVARD MEDICAL SCHOOL, MAY 6, 1993

Letter from: Kathryn E. West, Associate Dean for Operations, Harvard Medical School

Dean West comments as an abutter to the College. Harvard Medical School has reviewed the Project plans and believes that the Project has no negative environmental impacts of significance and that the mitigation measures are more than sufficient to mitigate any impacts of the project. She is in favor of upgrading the Campus and applauds the manner in which the Project has been undertaken.

nepa

Harvard Medical School

25 Shattuck Street
Boston, Massachusetts 02115
(617) 432-0943
(617) 432-2596 - FAX

Kathryn E. West
Associate Dean for Operations

May 6, 1993

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MEPA

Honorable Trudy Coxe
Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, MA 02202

Re: Massachusetts College of Pharmacy & Allied Health Sciences Project
DPIR/DEIR - EOEA #9309

Dear Secretary Coxe:

On behalf of Harvard Medical School, I am writing to comment on the DPIR/DEIR submitted by the Massachusetts College of Pharmacy and Allied Health Sciences outlining the proposed development program at its campus at 179 Longwood Avenue in Boston, Massachusetts.

Harvard Medical School is an institutional abutter of the College and as such has received a full briefing on the project by representatives of the College. As a result of our review of the project, it is our opinion that the proposed project is sustainable at the site, is in keeping with objectives of the College, and has no negative environmental impacts of significance. The traffic and parking management plan, the construction management plan and the mitigation measures for daily operations which are outlined in the DPIR/DEIR are more than sufficient to mitigate any impacts of the project.

We applaud our neighboring institution's efforts to remain current and upgrade its facilities and the thoughtful manner in which the project has been undertaken. We urge you to grant their approvals with all due expedience.

Sincerely,

Kathryn E. West

5.0 CITY OF BOSTON ENVIRONMENT DEPARTMENT, MAY 3, 1993

Letter from: Lorraine M. Downey, Director

Director Downey commented that the DPIR/DEIR adequately addresses concerns raised by the review of the ENF, and adequately conforms to the scopes issued by MEPA and the BRA. Ms. Downey also suggested that the FPIR/FEIR clarify mitigation of traffic and parking impacts, and include mitigation measures for impacts on the adjacent Boston Latin School.

May 3, 1993

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Secretary Trudy Coxe
Executive Office of Environmental Affairs
100 Cambridge St. 20th Floor
Boston, MA 02202

City of Boston
The Environment Department

Raymond L. Flynn
Mayor

Lorraine M. Downey
Director

Boston City Hall Room 805
Boston Massachusetts 02201
617 635 4416 F 635 3550

Attn: Jacki Wilkins, MEPA Unit
RE: EOEA #9309, Massachusetts College of Pharmacy New Building and White Building Renovation, Boston (Longwood)

Dear Secretary Coxe:

The City of Boston Environment Department has reviewed the Draft Project Impact Report/Environmental Impact Report (DPIR/DEIR) for the proposed project referenced above and hereby submits the following comments in response:

The DPIR/DEIR adequately addresses the concerns raised by the review of the ENF, and adequately conforms to the scopes issued by MEPA and the Boston Redevelopment Authority (BRA). The DPIR/DEIR also presents a convincing argument that the preferred alternative (Alternative B) most effectively minimizes environmental impacts on surrounding structures.

Nonetheless, several concerns await resolution in the FPIR/FEIR. The issues of parking remains confusing and in need of further mitigation. Page V-1.3 states that 100 of the surface parking spaces on site will be replaced by 80-100 subsurface spaces in the future, implying a decrease of up to 20 spaces on site. However, table V-1.1 lists 100 subsurface spaces as a definitive number. Page VI-4.1 again uses the 80-100 parking space range, while at other points the garage function is noted as replacement parking, implying that the actual number of spaces proposed in the garage will be 100.

The FPIR/FEIR should commit to a definite number of parking spaces, preferably 50 above ground spaces in landscaped lots and 80 below grade spaces in the garage. This would result in a net decrease of 20 parking spaces over the current situation, and should be considered a reasonable mitigation measure for current and future traffic impacts. Currently, 78.3% of the faculty access the site via private auto. Improving the transit/bicycle modal split among faculty would allow for a reduction in parking spaces. Transit subsidies for faculty and employees and high parking fees are proven methods of reducing demand for parking spaces.

5.1

5.2

Shadow impacts and daylight obstruction on the adjacent Boston Latin School continue to be a source of concern. These impacts have been reduced since the submission of a Project Notification Form to the BRA in January, but will still be noticeable (especially during school hours) when school is in session. 5.3

The noise analysis is adequate, and the Environment Department concurs with the selection of the business standard as most appropriate for abutting uses. The proponent should design mechanical features of the building with the goal in mind of compliance with the business standard as measured from the vertically extended property lines of adjacent sites.

The current recycling program of the College is admirable, and should be expanded beyond paper and cardboard collection. The design of the loading dock should incorporate ample space for an expanded recycling initiative. The FPIR/FEIR should firm up the commitment on p. IV-8.3 to expand recycling activities.

In conclusion, the DPIR/DEIR is generally well-written and answers most concerns with the proposed project adequately. The FPIR/FEIR should clarify the mitigation of traffic and parking impacts and should also include feasible and creative mitigation measures for impacts on the adjacent Boston Latin school.

I thank you for your time and consideration.

Sincerely,

L M Downey

Lorraine M. Downey
Director

LMD/AP:ap

cc: Beverly Johnson, BRA
Mitchell Fischman, HMM

5.1 *Clarify number of parking spaces.*

Response:

After further analysis of the parking and additional discussions with the BRA and BCDC, the College has determined that 28 at-grade spaces will be provided in two landscaped lots in front of the College, and 91 to 96 below-grade spaces will be provided within the garage. A detailed discussion of this parking proposal is provided in Section V-2.4 of the FPIR/FEIR.

5.2 *Improvements to Modal Split and Increase in Parking Fees.*

Response:

The College will require parking fees for faculty and staff following occupancy of the New Building. In addition, the College will subsidize MBTA passes for faculty and staff, and participate in MASCO's transportation planning process.

5.3 *Shadow impacts and daylight obstruction on the adjacent Boston Latin School.*

Response:

As noted by the City's Environment Department, Alternative B most effectively minimizes environmental impacts on surrounding structures.

6.0 EXECUTIVE OFFICE OF ECONOMIC AFFAIRS, MAY 7, 1993

Letter from: Stephen P. Tocco, Secretary, Executive Office of Economic Affairs

Secretary Tocco wrote to express support for the Project. He suggested that the Project will insure the continued preeminence of the City of Boston in the field of health care, and provide significant economic benefits to the City and the Commonwealth.

The Commonwealth of Massachusetts
Executive Office of Economic Affairs
One Ashburton Place -- Room 2101
Boston, MA 02108

WILLIAM F. WELD
Governor

ARGEO PAUL CELLUCCI
Lieutenant Governor

STEPHEN P. TOCCO
Secretary

TELEPHONE
617 727 6381

FACSIMILE
617 727-4426

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6.0

May 7, 1993

Honorable Trudy Coxe, Secretary
Executive Office of Environmental Affairs
Commonwealth of Massachusetts
100 Cambridge Street, 20th Floor
Boston, Massachusetts 02202

Attn: MEPA Unit - - Jacki Wilkins

Re: EOEA # 9309, Massachusetts College of Pharmacy and Allied Health Sciences Project, 179 Longwood Avenue, Boston, MA

Dear Secretary Coxe:

I am writing to express the support of the Executive Office of Economic Affairs for the Massachusetts College of Pharmacy and Allied Health Sciences Project, which is the subject of a DEIR/DPIR currently undergoing review by your office. This project will be a significant component of the Longwood Medical Area, and will further the goals of scientific research, care, and education. The Project will insure the continued preeminence of the City of Boston in the field of health care, and provide significant economic benefits to the City and the Commonwealth.

Please record the support of the Executive Office of Economic Affairs for this project.

Sincerely

Stephen P. Tocco
Secretary

7.0 MASSACHUSETTS COLLEGE OF ART, MAY 4, 1993

Letter from: William F. O'Neil, President, Massachusetts College of Art

President O'Neil expressed his support of the Project after thoroughly reviewing the DPIR/DEIR. He felt that the Project would not have any significant environmental impacts and that the proposed mitigation for traffic and parking was adequate. He has also reported that the Massachusetts College of Art (MCA) has received commitment by the College to work with the MCA on the coordination of street and infrastructure repair work on Palace Road.

621 Huntington Avenue
Boston Massachusetts 02115-5882
617.232.1555

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May 4, 1993

7.0

Secretary Trudy Coxe
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, MA 02202

Re: Massachusetts College of Pharmacy & Allied Health Sciences Project
DPIR/DEIR - EOEA #9309

Dear Secretary Coxe:

On behalf of the Massachusetts College of Art, I am writing to comment on the Massachusetts College of Pharmacy and Allied Health Science's development project at its campus at 179 Longwood Avenue in Boston, Massachusetts. We have received and reviewed the DPIR/DEIR for the project, EOEA #9309, and have been provided with a full briefing on the proposal by the representatives of the College.

After thorough review, it is our assessment that the project has no significant negative environmental impacts. Moreover, we have received the commitment of the College to work with us on coordination of street and infrastructure repair work on Palace Road. The development is well designed and the DPIR/DEIR report outlines a comprehensive plan for mitigation of impacts related to traffic and parking management, construction management, and operation.

We encourage you to grant the Massachusetts College of Pharmacy the approvals it seeks.

Sincerely,

William F. O'Neil
President

WFO/jb

8.0 MASSACHUSETTS BAY TRANSPORTATION AUTHORITY, APRIL 29, 1993

Letter from: Victoria R. Marks, Project Manager, MBTA

Ms. Marks, an MBTA project manager, is pleased that the College has reduced the proposed number of on-site parking spaces. She commented that the reduction in available parking should be of some help for the operations of the Huntington Avenue/ Longwood Avenue intersection.

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

Planning and Budget
Ten Park Plaza Boston, MA 02116

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MAY 1993
MEPA

8.0

April 29, 1993

Trudy Coxe, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, Massachusetts 02202

Attention: Jacki Wilkins
MEPA Unit

Subject: Massachusetts College of Pharmacy and Allied Health Sciences
Draft Project Impact Report/Draft Environmental Impact Report (DPIR/DEIR)
EOEA File No. 9309

Dear Secretary Coxe:

The Massachusetts Bay Transportation Authority (MBTA) has reviewed the DPIR/DEIR for the Massachusetts College of Pharmacy and Allied Health Sciences project on Longwood Avenue in Boston. The proposed development will include the construction of approximately 187,000 gross square feet of new space which is designed to improve and consolidate facilities and a new below grade parking garage for approximately 100 cars. There will be no increase in the overall number of parking spaces at the site. Listed below are the areas of concern to the MBTA.

The MBTA is pleased the developer has reduced the proposed number of on-site parking spaces to equal the number currently existing on the site. This should be of some help for the Huntington/Longwood Avenue intersection by not exacerbating an already inadequately operating intersection. However, the intersection will continue operating at Level of Service (LOS) F during both the AM and PM peak periods. **8.1** While the LOS remains at F in both the build and no-build models, the MBTA hopes the developer would offer assistance for potential mitigation measures at this intersection. The MBTA operates Bus Route 39 through this intersection. This bus route, along with other traffic (including Massachusetts College of Pharmacy and Allied Health Sciences traffic) experiences a delay of over three minutes at this intersection.

Thank you for the opportunity to submit these comments.

Sincerely,

Victoria R. Marks
Project Manager

JSO'B/lea

8.1 *Assistance for potential mitigation measures at the Huntington Avenue/Longwood Avenue intersection.*

Response:

The College believes that implementation of an aggressive TDM program will prove successful in reducing traffic impacts, particularly since the Project will have minimal increases in peak hour trips at this intersection. However, in light of the MBTA's concerns, the College recently met with MASCO staff to discuss potential improvements at its site. The College will continue to cooperate with MASCO and will assist in implementing improvements, as appropriate.

9.0 BOSTON WATER AND SEWER COMMISSION, MAY 7, 1993

Letter from: John P. Sullivan, Jr., P.E., Chief Engineer, Boston Water & Sewer Commission

Mr. Sullivan comments that the replacement of the sewers on Palace Road will begin this summer and suggests that the College contact BWSC to connect their sanitary and sewer lines to the new pipes. Mr. Sullivan also advised that a direct connection to the 42-inch water main in Huntington Avenue will not be permitted and that alternatives should be discussed with BWSC.

Boston Water and Sewer Commission

425 Summer Street
Boston, MA 02210-1700
517-330-9400
Fax 617-330-5167

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May 7, 1993

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Ms. Trudy Coxe, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, MA 02202

Attn: MEPA Unit

Re: Massachusetts College of Pharmacy
New Building DEIR
EOEA No. 9309

Dear Secretary Coxe:

The Commission has reviewed the Draft Environmental Impact Report (DEIR) for the Massachusetts College of Pharmacy and Allied Health Sciences Project proposed at its site at 179 Longwood Avenue in the Longwood Medical Area section of Boston.

The proponent proposes to attach the New Building to the rear of the existing White Building. The New Building is designed to accommodate classrooms, faculty offices, laboratories, research space and housing for 175 to 180 students. A new below grade parking garage for 80 to 100 cars will be located under the New Building. The proponent also proposes to renovate the existing White Building.

The Draft Environmental Impact Report states that the average daily water consumption will be 64,230 gallons per day (gpd) which includes the peak makeup water requirement of 20,000 gpd. The wastewater generated by this project is estimated at 40,012 gpd.

The Commission has spoken to the proponent about the Commission's plans to replace sewers on Palace Road, adjacent to the project site. This summer the Commission will begin to replace most of the sanitary sewer and storm drains on Palace Road. The proponent can contact the Commission so that arrangements can be made with the Commission's contractor to connect the proponent's sanitary and stormwater lines to the new pipes. 9

In Section 3.5- System Connections, the DEIR states that fire protection service is available from the 42 inch SHS water main on Huntington Avenue. The proponent is advised that a direct connection to the 42 inch water main in Huntington Avenue will not be permitted. The proponent should discuss alternatives with the Commission. 9.2

Thank you for the opportunity to comment on this project.

Yours truly,

John P. Sullivan. Jr., P.E.
Chief Engineer

JPS/PK/mo

cc: Benjamin Hershenson - MCPAHS
Patrick J. Foley, BWSC
Stephan Shea, BWSC
Susan Norton, MWRA

9.1 *Connection of the proponent's sanitary and stormwater lines to the new pipes to be installed in Palace Road.*

Response:

BWSC, during the summer of 1993, plans to replace both sanitary and storm sewers in Palace Road. The existing sewers were found to be damaged during routine inspection by the City. BWSC has indicated that the sewers will be replaced by same size pipes because the existing sewer pipes were determined by BWSC to have sufficient capacity. Construction bids were to be taken by BWSC during the week of May 17.

The College will discuss the Project tie-in to the new sanitary and storm sewers with BWSC.

9.2 *The Project proponent should discuss alternatives with the Commission.*

Response:

The proponent is aware that direct access to the 42-inch High Pressure Line is not permitted. However, because of the proximity of the High Pressure Line to the Project site, indirect access via the Low Pressure Mains would assure sufficient available water for fire fighting purposes. Based on a discussion with BWSC, this emergency tie-in will be acceptable. See Section VII-3.0 of the FPIR/FEIR for additional discussion.

10.0 BUILDING AND CONSTRUCTION TRADES COUNCIL OF THE METROPOLITAN DISTRICT, MAY 3, 1993

Letter from: Joseph W. Nigro, Jr., General Agent/Secretary Treasurer, Boston Building Trades Council

It is Mr. Nigro's assessment that no significant environmental impacts will result from the Project, and that comprehensive mitigation measures are planned for both construction management, traffic, and parking management. He is pleased that representatives of the College have committed to make this a union construction project.

Building and Construction Trades Council of the Metropolitan District

AFFILIATED TO THE

BUILDING AND CONSTRUCTION TRADES DEPARTMENT

AFL-CIO

TERRITORIAL JURISDICTION

Arlington, Boston, Belmont, Brookline, Burlington, Cambridge, Canton, Chelsea, Dedham, Everett, Malden, Medford, Melrose, Milton, Norwood, Reading, Revere, Somerville, Stoneham, Wakefield, Westwood, Winthrop, Winchester, Woburn, and the Islands of Boston Harbor

TELEPHONE
617 - 282-0080

645 MORRISSEY BOULEVARD
SUITE 2
BOSTON, MA 02122-3520

10.0

RECEIVED
MAY 1 1993
MEPA

May 3, 1993

Honorable Trudy Coxe
Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, MA 02202

Re: Massachusetts College of Pharmacy & Allied Health Sciences
Project DPIR/DEIR - EOEA #9309

Dear Secretary Coxe,

On behalf of the Boston Building Trades, I am writing to comment on the DPIR/DEIR submitted by the Massachusetts College of Pharmacy & Allied Health Sciences, for its proposed building program at 179 Longwood Avenue.

I have had occasion to meet with project proponents and received a briefing on the project plans. It is my assessment that no significant environmental impacts will result from the project, and that comprehensive mitigation measures are planned for both construction management, traffic and parking management. Representatives of the College have committed to make this a union construction project.

This is the type of project which should go forward through permitting with all due speed. It is good for the City of Boston, the institutional/health care community and Boston's Building Trades can benefit as well. I urge you to grant the approvals requested by the Massachusetts College of Pharmacy & Allied Health Sciences. We look forward to an early start to construction.

Sincerely,

Joseph W. Nigro

Joseph W. Nigro, Jr.
General Agent/Secretary Treasurer
Boston Building Trades Council

APPENDICES

APPENDICES

APPENDIX A - BRA Scoping Determination on the PNF, February 16, 1993

APPENDIX B - Secretary of Environmental Affairs Certificate on the ENF, March 11, 1993

APPENDIX C - BRA Preliminary Adequacy Determination on the DPIR, May 21, 1993

APPENDIX D - Secretary of Environmental Affairs Certificate on the DEIR, May 14, 1993

APPENDIX E - Erosion Study for Pedestrian Level Wind Analysis

APPENDIX F - Revised Schematic Design Submission

APPENDIX G - Project Support Letters for BRA

APPENDIX A

BRA Scoping Determination on the PNF, February 16, 1993

REDEVELOPMENT
AUTHORITY

February 16, 1993

Mr. Louis P. Jeffrey, President
Massachusetts College of Pharmacy
and Allied Health Services
179 Longwood Avenue
Boston, Ma 02201-1007

Re: Massachusetts College of Pharmacy Project

Dear Mr. Jeffrey:

Enclosed is the Scoping Determination for the Massachusetts College of Pharmacy Project (the "Proposed Project"), for which you submitted a Project Notification Form ("PNF") pursuant to Article 31 of the Boston Zoning Code.

This Scoping Determination requests information required by the Boston Redevelopment Authority in response to the PNF submitted January 13, 1993.

While the PNF identifies a design option, Alternative A, a revised scheme, Alternative B, has subsequently been prepared and is currently under review by BRA staff. This Scope assumes that Alternative B will be analyzed in the Project Impact Report. In carrying out this analysis, a complete description should be provided of this option. Furthermore, particular attention should be addressed to the urban design and traffic impacts.

Additional information may be required during the course of review of the Proposed Project. If you have any questions regarding the Scoping Determination or the review process in connection with the Proposed Project, please contact Michael Hunter, Project Manager, ext. 4226, or Larry Koff, Project Coordinator, 722-4300, ext. 4389.

Sincerely,

Beverley E. Johnson

Beverley Johnson
Assistant Director
Institutional Planning
and Development

B13/20.LTR/021193/1

BOSTON REDEVELOPMENT AUTHORITY
SCOPING DETERMINATION

MASSACHUSETTS COLLEGE OF
PHARMACY PROJECT

SUBMISSION REQUIREMENTS
FOR DRAFT PROJECT IMPACT REPORT (DPIR)

PROPOSED PROJECT:	Massachusetts College of Pharmacy, Research/Dormitory Project
PROJECT LOCATION:	179 Longwood Avenue
APPLICANT:	Massachusetts College of Pharmacy
PNF SUBMISSION DATE:	January 13, 1993

The Boston Redevelopment Authority ("BRA") is issuing this Scoping Determination pursuant to Section 31-5 of the Boston Zoning Code (the "Code"). This Scoping Determination requests information required by the BRA for its review of the Proposed Project in connection with the following:

(a) Development Review in compliance with Article 31 of the Code.

(b) Recommendations with respect to the zoning relief for the Proposed Project. (Under the existing zoning, required zoning relief for the Proposed Project consists of relief from the Board of Appeal pursuant to Articles 6 and 7 of the Code. Under a zoning amendment to be proposed by the BRA, required zoning relief would consist of Institutional Master Plan approval from the Zoning Commission.)

(c) Approval of a Development Impact Project Plan, pursuant to Article 26A of the Code, and the agreements for the Development Impact Project Contribution and Jobs Contribution Grant, pursuant to Article 26A and 26B of the Code; and

(e) Review and approval of the Massachusetts College of Pharmacy Master Plan.

<u>PREAMBLE</u>

The BRA is reviewing the Proposed Project pursuant to multiple sections of the Code. The Proposed Project is being reviewed in voluntary compliance with Article 31.

Development Review Requirements, which sets out a comprehensive procedure for project review and requires the BRA to review the design, transportation, environmental and other impacts of proposed projects. Article 31 requires the submission of a satisfactory Final Project Impact Report ("FPIR") prior to the issuance of a building permit.

The applicant's submittals indicate that, under existing zoning, that the Proposed Project requires zoning relief pursuant to Articles 6 and 7 of the Code. Specifically, Development Impact Project Plan approval pursuant to Articles 26A and 26B of the Code.

Under the zoning amendment to be proposed by the BRA, the Proposed Project would be subject to institutional master plan zoning. The zoning relief required would take the form of Zoning Commission approval of an Institutional Master Plan adequately describing the Proposed project. No zoning relief would be required pursuant to Article 6 or 7.

Under both the current and proposed zoning, Proposed Project also requires DIP Plan approval pursuant to Articles 26A, Development Impact Projects - Housing and 26B, Development Impact Projects - Jobs. Prior to receiving the zoning relief listed above, the Applicant must meet DIP requirements pursuant to Sections 26A-3 and 26B-3 of the Code. These requirements include that the BRA approve the DIP Plan after a public hearing and that the applicant enter into a DIP Agreement with the BRA.

I. MASSACHUSETTS COLLEGE OF PHARMACY

The Massachusetts College of Pharmacy and Allied Health Sciences (MCP) was founded in 1823 to provide an undergraduate program in pharmacy education. The College has since expanded its programs to include nursing and the allied health sciences at both the undergraduate and graduate level as well as research and continuing education programs and service to professional associations.

The campus is uniquely located adjacent to the hospitals and teaching institutions utilized by its students and faculty. Both clinical faculty and students participate at and contribute their services at affiliate hospitals including Brigham and Women's, Beth Israel, Dana Farber Cancer Institute, New England Deaconess.

Originally designed to accommodate 600 persons, the College currently serves a population of 1,326 full-time students and 134 faculty and staff in two buildings on its existing 179 Longwood Avenue campus. An increase in applications and changes in the demographic profile of the student body have recently taken place. Whereas fifteen years ago the majority of the students originated from the New England area, the current student body includes students from 35 states and 24 countries. During the past seven years, applications have risen steadily by 37%. These trends require

the College to provide on campus affordable housing as well as contemporary facilities to accommodate the research and teaching needs of the College.

The campus is situated on a rectangular parcel containing 90,240 square feet located at the comer of Longwood Avenue and Palace Road. Abutters include to the west, the former Lying In Hospital, to the east the Massachusetts College of Art, and to the north Boston Latin.

The property consists of three buildings containing a total of 90,630 square feet. There are three surface parking lots providing parking for 150 cars.

The White Building constructed in 1914 contains 67,530 square feet of space utilized for classrooms, laboratory and administration. The Newton building is located to the rear of the property. Constructed in 1961, this four story structure contains 22,000 square feet of laboratory and office space. A 1,000 square foot garage structure located on the western edge of the property has been converted to storage and administrative support.

The Massachusetts College of Pharmacy has been contemplating for over three years the proposed expansion project. Their needs have included the provision of renovated and expanded academic areas for research and teaching as well as the provision of a residence hall and dining space. The College currently houses some 150 students in dormitory space which has been leased from Emmanuel College. The term of this lease expires in 1995.

Proposed is a total addition of some 269,855 gross square feet at an estimated cost of $30 million. Included is a 7,000 square foot addition to the White building, a five split-level below grade garage containing parking for some 220 cars, 41,100 square feet, for administrative support, and 125,664 square feet for laboratories and dormitory uses. The dormitory will provide housing for 175 students. The structure is eight stories high with a penthouse for mechanical equipment.

The laboratory space will provide 67,440 FAR square feet for research which will be leased to Brigham and Women's Hospital. The Channing laboratory which is currently located across the street on the Harvard Medical School campus will relocate to this facility. Some 200 MDs, PH.Ds, students and support staff who will be carrying out a combination of wet lab and dry lab/computer based studies.

In addition to the 220 space below grade garage are the proposed use of 50 surface parking spaces currently located on the front yard of the Massachusetts College of Pharmacy property. Access to the below grade garage as well as loading dock will be from Palace Road.

In determining the Floor Area Ratio, the total projects consists of 165,664 square feet. The garage and White building addition are not counted in this calculation. The

proposed Floor Area Ratio is estimated at 2.92. The parcel is currently zoned with an FAR of 3.

II. MASSACHUSETTS COLLEGE OF PHARMACY MASTER PLAN

A Draft Institutional Master Plan was prepared by consultants to the Massachusetts College of Pharmacy in 1990. This document will be updated to describe the development program currently being proposed by the College as well as to include information pertinent to the requirements for an Institutional Master Plan that will be established by a proposed zoning amendment. The Master Plan will need review and approval from the BRA and the Boston Zoning Commission.

III. APPLICABLE ZONING PROVISIONS AND REQUIRED RELIEF

A. RELIEF UNDER CURRENT ZONING

The area in which the Proposed Project is located is currently zoned H-3 by the Boston Zoning Code. Numerous provisions of the Boston Zoning Code apply to the Proposed Project under existing zoning. The Proposed Project requires zoning relief in the form of: (1) variances pursuant to Article 7 of the Code; and (2) conditional use permits pursuant to Article 6 of the Code.

Variances

Under current zoning, the Proposed Project requires variances for rear yard, side yard, and parapet setback. Conditions required for approval of variances are outlined in Section 7-3 of the Code.

Conditional Use Permits

Under current zoning, the Proposed Project requires conditional use permits for use items identified in Section 8-7, including research laboratory (24), dormitory (12), and academic facilities (16A) in an H-3 district, and an off-street parking garage in a restricted parking district. Conditions required for approval of a conditional use permit are outlined in Section 6-3 of the Code.

B. RELIEF UNDER PROPOSED ZONING

The Boston Redevelopment Authority intends to submit an amendment to the Boston Zoning Code that would provide for Institutional Master Plan zoning for a portion of the Longwood Medical Area that would include the Massachusetts College of Pharmacy site. The BRA expects that notice of such an amendment will be published by the Zoning Commission before a building permit application is filed for the Proposed Project and will, therefore, govern the Proposed Project.

Under the proposed amendment, the Proposed Project's use, height, FAR, setbacks, and parking would be allowed if they are adequately described in an Institutional Master Plan approved by the Zoning Commission. No zoning relief would be required pursuant to Articles 6 and 7. The requirement of Zoning Commission approval of an Institutional Master Plan containing an adequate project description would constitute zoning relief for purposes of Articles 26A and 28B (DIP Projects). Procedures and standards for approval of an Institutional Master Plan will be outlined in the proposed zoning.

C. DEVELOPMENT IMPACT PROJECT PLAN APPROVAL

Under both the current and proposed zoning, the Proposed Project also requires DIP approval pursuant to Articles 26A, Development Impact Projects -- Housing, and 26B, Development Impact Projects -- Job Training. Prior to receiving zoning relief, the Applicant must meet the DIP requirements, pursuant to Sections 26A-3 and 26B-3 of the Code. These include requirements that the BRA approve the DIP Plan after a public hearing, and that the Applicant enter into a DIP Agreement with the BRA.

IV. COMMUNITY REVIEW OF THE PROPOSED PROJECT

The proponent should provide a description of the intended community review process. The description should include the names of neighborhood groups and/or individuals who will be involved, the nature of their role, and a generalized schedule of the process. BRA staff and the Mayor's Office of Neighborhood Services (ONS) will work with MCP, the Mission Hill PZAC and the residents of the Fenway neighborhood to facilitate community review of the Proposed Project and of the Institutional Master Plan.

DEVELOPMENT REVIEW REQUIREMENTS - ARTICLE 31

SUBMISSION REQUIREMENTS

In addition to full-size scale drawings, 15 copies of a bound booklet containing all submission materials reduced to size 8-1/2" x 11", except where otherwise specified, are required. In addition, an adequate number of copies must be available for community review. Included in the submission materials should be a copy of this Scoping Determination for review.

A. GENERAL INFORMATION

1. Applicant Information

a. Development Team

(1) Names

(a) Developer (including description of development entity and type of corporation)

(b) Attorney

(c) Project consultants

(2) Business address and telephone number for each.

(3) Designated contact for each.

(4) Description of currently- or formerly-owned developments in Boston.

b. Legal Information

(1) Legal judgments or actions pending concerning the Proposed Project.

(2) Evidence of site control over the project area, including current ownership and purchase options of all parcels in the Proposed Project, all restrictive covenants and contractual restrictions affecting the proponent's right or ability to accomplish the Proposed Project and the nature of the agreements for securing parcels not owned by the prospective developer.

(3) History of tax arrears on property owned in Boston by the Applicant.

(4) Nature and extent of any and all public easements into, through, or surrounding the site.

2. Financial Information (See appendix 1 for required financial information, which may be submitted under separate cover)

Development and Operating Financial Data, as appropriate for a private non-profit educational and research institution, must be provided for the Proposed Project.

a. Full disclosure of names and addresses of all financially involved participants and bank references.

b. Development Pro Forma.

c. Operating Pro Forma for the proposed facilities.

3. Project Area

a. Description of metes and bounds of project area or certified survey of project area.

b. An area map identifying the location of the proposed project.

4. Public Benefits

a. Development Impact Project Contribution and Jobs Contribution Grant specifying amount of housing linkage and jobs linkage contributions and method of housing linkage contribution (housing payment or housing creation).

b. Adjustment in tax revenues, specifying existing and estimated future Payment In Lieu of Taxes (Pilot).

c. Anticipated employment levels including the following:

(1) Estimated number of construction jobs

(2) Estimated number of permanent jobs

d. Other public benefits, if any, to be provided.

5. Regulatory Controls and Permits

a. Existing and proposed zoning requirements, zoning computation forms, and any anticipated requests for zoning relief should be explained.

b. Anticipated permits required from other local, state, and federal entities with a proposed application schedule should be noted.

c. If the Proposed Project becomes subject to the Massachusetts Environmental Policy Act (MEPA), required documentation should be provided including, but not limited to, copies of the Environmental Notification Form and a proposed schedule for coordination with BRA procedure.

6. Community Groups

a. Names and addresses of project area owners, displacees, abutters, and also any community or business groups which, in the opinion of the applicant, may be substantially interested in or affected by the Proposed Project.

b. A list of meetings proposed and held with interested parties.

B. TRANSPORTATION COMPONENT

A Transportation Access Plan shall be prepared as defined by the Scope of Services outlined in Appendix 2.

C. ENVIRONMENTAL PROTECTION COMPONENT

1. Wind

A qualitative analysis of the potential wind impacts of the proposed project at the pedestrian level shall be required for the Draft Project Impact Report. This analysis shall determine potential pedestrian level winds adjacent to and in the vicinity of the project site and shall identify any areas where wind velocities are expected to exceed acceptable levels, including the Authority's guideline of an effective gust velocity of 31 mph not to be exceeded more than 1% of the time. Particular attention shall be given to the potential wind effects of the new building element of the proposed project.

Areas of interest for the analysis shall include public and other areas of pedestrian use, including, but not limited to, entrances to the project

buildings, sidewalks adjacent to and in the vicinity of the project buildings, and pedestrian areas in the vicinity of the project development, including the adjacent Boston Latin School.

For areas where wind speeds are projected to exceed acceptable levels, measures to reduce wind speeds and to mitigate potential adverse impact shall be identified.

Should the qualitative analysis indicate the possibility of excessive pedestrian level wind speeds, additional studies, including wind tunnel testing, may be required for the Final Impact Report.

2. <u>Shadow</u>

A shadow analysis shall be required for existing and build conditions for the hours 9:00 a.m., 12:00 noon, and 3:00 p.m. for the vernal equinox, summer solstice, autumnal equinox, and winter solstice. It should be noted that due to time differences (daylight savings vs. standard), the autumnal equinox shadows would <u>not</u> be the same as the vernal equinox shadows and therefore separate shadow studies are required for the vernal and autumnal equinoxes.

The shadow impact analysis must include net new shadow as well as existing shadow and must clearly show the incremental impact of the proposed new building.

Particular attention shall be given to existing or proposed public open spaces and major pedestrian areas, including, but not limited to, the sidewalks adjacent to and in the vicinity of the proposed project and pedestrian areas and other public open spaces within the project vicinity, including the adjacent Boston Latin School.

Design or other mitigation measures to limit or avoid any adverse shadow impact shall be identified.

3. <u>Daylight Analysis</u>

A daylight analysis is required, taking at least three viewpoints. One viewpoint should be taken from Longwood Avenue, centered on the White building facade. A second should be taken from Palace Road, centered on the midpoint of the two main facades (existing and proposed) fronting on Palace Road. Alternatively, two viewpoints may be utilized, one centered on each primary facade on this frontage, and their separate values averaged. A third viewpoint should be taken from the Boston Latin School walkway. Comparison should be made to values for either the existing

zoning "envelope" for the site, or structures of comparable size in the area. (A comparison to downtown values is not appropriate.) The BRADA program must be used.

4. Air Quality

A future air quality (carbon monoxide) analysis shall be required for any intersection where level of service is expected to deteriorate to D and the project causes a 10 percent increase in traffic or where the level of service is E or F and the project contributes to a reduction of LOS. The methodology and parameters of the traffic-related air quality analysis shall be approved in advance by the Massachusetts Department of Environmental Protection and the Boston Redevelopment Authority. Mitigation measures to eliminate or avoid any violation of air quality standards shall be described.

A description of the parking garage exhaust system and of the exhaust systems of the project's research laboratories, including location of intake and exhaust vents and specifications, and an analysis of the impact on pedestrian level air quality from operation of the exhaust systems shall be required. Potential emissions of any air contaminants from the project's laboratories shall be identified and quantified. Measures to prevent or control the release of such contaminants and to avoid any violation of air quality standards shall be described.

An analysis of the potential emission of pollutants from any space heating and steam facilities of the proposed project and a description of measures to minimize the emission of pollutants also shall be included in the DPIR. Required State permits for on-site boilers shall be described, if applicable.

5. Water Quality

The proposed project will direct stormwater runoff from the site, including parking areas, paved pedestrian areas, landscaped areas, and roof drainage, into an existing storm drain system which discharges into the Muddy River. Therefore, the impacts of the proposed project on the water quality of the Muddy River shall be evaluated. Measures to be employed to prevent the introduction of any pollutants into the river (such as the installation of oil/grease separators) shall be described.

In addition, sewage from the proposed project may include process waste water from laboratories and miscellaneous diluted biological materials from lab sinks. The DPIR shall identify the biological and chemical components which will be discharged into the sanitary waste stream and shall quantify their anticipated concentrations. Measures to eliminate the introduction of

contaminants into the waste stream, as well as to prevent the disposal of hazardous substances (such as organic liquids and low-level radioisotopes) shall be described. An explanation of how biological materials are inactivated and how the inactivation process is verified also shall be required.

Federal, State, and municipal permits regulating sewer connection, use, and discharges shall be described.

6. Solid and Hazardous Wastes

The presence of any contaminated soil or groundwater shall be evaluated and remediation measures to ensure their safe removal and disposal shall be described. The assessment of site conditions pursuant to the requirements of M.G.L. Chapter 21E should be included in the DPIR.

The DPIR shall describe the generation, storage, and disposal of all solid wastes from the operation of the proposed project, with particular emphasis on the generation of any hazardous wastes or contaminants, including chemical, radioactive, and biological wastes, from research activities. The DPIR shall identify the specific nature of the hazardous wastes and the quantities to be generated and shall describe the management and disposal of these wastes. Measures to prevent the release of any contaminants shall be described.

In addition, measures to promote the reduction of waste generation and recycling, particularly for paper and other recyclable products, shall be described in the DPIR.

7. Noise

An analysis of the potential noise impacts from the project's mechanical and exhaust systems and compliance with applicable regulations of the City of Boston shall be required. A description of the project's mechanical and exhaust systems and their location shall be included. Measures to minimize and eliminate adverse noise impacts on nearby sensitive receptors including Boston Latin shall be described.

8. Geotechnical Impact

An analysis of existing sub-soil conditions, groundwater levels, potential for ground movement and settlement during excavation, and potential impact on adjacent buildings and utility lines shall be required. This analysis shall also include a description of the foundation construction methodology, the

amount and method of excavation, and measures to prevent any adverse effects on adjacent buildings and utility lines.

Measures to ensure that groundwater levels will not be lowered during or after construction also shall be described.

9. Infrastructure Systems Component

An infrastructure impact analysis must be performed. The discussion of Proposed Project impacts on infrastructure systems should be organized system-by-system as suggested below. The applicant's submission must include an evaluation of the Proposed Project's Impact on the capacity and adequacy of existing water, sewerage, energy (including gas and steam), and electrical communications (including telephone, fire alarm, computer, cable, etc.) utility systems, and the need reasonably attributable to the proposed project for additional systems facilities.

Any system upgrading or connection requiring a significant public or utility investment, creating a significant disruption in vehicular or pedestrian circulation, or affecting any public or neighborhood park or streetscape improvements, comprises an impact which must be mitigated. The DPIR must describe anticipated impacts in this regard, including specific mitigation measures, and must include nearby Proposed Project buildout figures in the analysis.

In the case of the MCP project, particular consideration should be given to the location and configuration of connections (existing vs. new, etc.), the proposed separation of storm drain and sanitary sewer systems, and construction dewatering impacts. More information regarding control of contaminant discharge into the Muddy River is requested.

a. Water and Sewer Systems

The Water and Sewer Systems Analysis must include the following:

(1) Estimated water consumption and sewerage generation from the Proposed Project and the basis for each estimate. Include separate calculations for air conditioning system make-up water.

(2) Description of the capacity and adequacy of water and sewer systems and an evaluation of the impacts of the Proposed Project on those systems. This evaluation should take into account the age of the system components adjacent to the site. Diagrams of the subject systems, showing proposed or existing connections, should be included.

(3) Identification of measures to conserve resources, including any provisions for recycling.

(4) Description of the Proposed Project's impacts on the water quality of the Muddy River or other water bodies that could be affected by the project. Include the impact of on-site storm drainage on water quality. Description of mitigation measures to reduce or eliminate impacts on water quality.

(5) Brief description of fire protection system and connections.

Some expansion of the material in the PNF on the proposed separation of sewer and stormwater systems is suggested. Thorough analysis and continuing discussions with BWSC are required.

Water supply systems adjacent to the project and servicing the project should be looped so as to minimize public hazard or inconvenience in the event of a main break.

(b) Energy Systems

The Energy Systems Analysis must include the following:

(1) Description of energy requirements of the project and evaluation of project impacts on resources and supply. Information is required regarding MATEP's ability to supply electrical and thermal energy for project needs.

(2) Description of measures to conserve energy usage and consideration of the feasibility of including solar energy provisions or other on-site energy provisions.

(3) Detail the energy source of the interior space heating; how obtained, and, if applicable, plans for reuse of cooling system condensate.

(4) Brief description of emergency power capabilities.

The location of transformer and other vaults required for electrical distribution or ventilation must be chosen to minimize disruption to pedestrian paths and public improvements both when operating normally and when being serviced, and must be described.

Other systems should be included in similar analyses if applicable: gas, steam, telephone, cable, fiberoptic communications, etc.

10. Construction Impacts

A construction impact analysis shall include a description and evaluation of the following:

(a) potential dust and pollutant emissions and mitigation measures to control these emissions.

(b) potential noise impact and mitigation measures to minimize increase in noise levels.

(c) location of construction staging areas and construction worker parking.

(d) construction schedule, including hours of construction activity.

(e) access routes for construction trucks and anticipated volume of construction truck traffic.

(f) method of demolition of the existing buildings on site, control of emissions, asbestos removal, and disposal of demolition waste, including identification of disposal site.

(g) generation and disposal of construction debris.

(h) potential for the recycling of demolition debris from the site.

(i) impact of project construction on rodent populations and description of the proposed rodent control program, including frequency of application and compliance with applicable City and State regulatory requirements.

(j) measures to protect the public safety.

D. URBAN DESIGN COMPONENT

The following comments refer to Alternative B. As a prelude to the discussion of urban design issues related to the Proposed Project, the Proponent is requested to provide narrative information on: (1) the need for the Proposed Project; (2) consideration given to alternative programs for the Proposed Project; and (3) consideration given to alternative locations for the Proposed Project.

The Proposed Project elements should be developed so as to (1) strengthen the overall urban design character of the site; (2) enhance the relationships among existing buildings; and (3) augment the existing pedestrian environment. The

Proposed Project elements should be designed and constructed so as to minimize visual impacts of the change in scale between the proposed building and existing buildings in the surrounding area.

The design of the Proposed Project should also address the following guidelines:

1. Replace the existing parking lots in the front yard (Longwood Avenue side of the building) with landscaped open space that will enhance the pedestrian environment;

2. Maximize the distance between the project and Boston Latin School to reduce the shadow impact on classroom windows;

3. Augment the effort to present an attractive and accessible building front on Palace Road;

4. Reduce the apparent building height by emphasizing cornices and reducing the roof volume; and

5. Develop the facade design to reinforce, without necessarily imitating, the masonry character of the district.

In order to determine that the Proposed Project: (a) is architecturally compatible with surrounding structures; (b) exhibits an architectural concept that enhances the urban design features of the area in which it is located; and (c) augments the quality of the pedestrian environment, the following items must be submitted:

1. Written description of program elements and space allocation for each element.

2. Plan for the surrounding area and district and sections at an appropriate scale (1" = 32' or larger) showing relationships of the Proposed Project to the surrounding area and district:

   a. massing

   b. building height

   c. open space

   d. major topographic features

   e. pedestrian and vehicular circulation

   f. land use

3. Black and white 8" x 10" photographs of the site and neighborhood.

4. Sketches and diagrams of earlier proposals to clarify design issues and massing options.

5. Eye-level perspective (reproducible line drawings) showing the proposal in the context of the surrounding area.

6. Aerial view of the project.

7. Site sections at 1" = 16' or larger showing relationships to adjacent buildings and spaces.

8. Site plan at an appropriate scale (1" = 16' or larger) showing:

   a. general relationships of proposed and existing adjacent buildings and open space.

   b. open spaces defined by buildings on adjacent parcels and across streets.

   c. general location of pedestrian ways, driveways, parking,service areas, streets, and major landscape features.

   d. pedestrian, handicapped, vehicular and service access and flow through the parcel and to adjacent areas.

   e. survey information, such as existing elevations, benchmarks, and utilities.

   f. phasing possibilities.

   g. construction limits.

9. Massing model at 1" = 100' for use in the BRA's base model and a study model at 1" = 16' showing facade design.

10. Drawings at an appropriate scale (e.g., 1" = 8') describing architectural massing, facade design and proposed materials including:

    a. building plans showing ground floors and typical upper floor(s).

    b. elevations in the context of the surrounding area.

    c. sections showing organization of functions and spaces.

11. Proposed schedule for submittal of design development materials.

Submission materials for Design Development and Contract Documents submissions can be found in Appendix 3.

E. HISTORIC RESOURCES COMPONENT

A historic resource analysis must assess the impacts of the Proposed Project's height, scale, massing, and other relevant environmental factors on any historic districts or buildings in the vicinity of the Proposed Development. The DPIR must also assess the potential presence of any archaeological resources which may be disturbed by the construction of the Proposed Project.

Appendix 1

REQUIRED FINANCIAL INFORMATION

REQUIRED FINANCIAL INFORMATION

MASSACHUSETTS COLLEGE OF PHARMACY

DEVELOPMENT PRO FORMA shall include all the information normally found in a development pro forma, as appropriate to a non-profit health care institution, by phase. This includes, but is not limited to:

- o Land costs, per land square foot and total, by parcel, including any incremental disposition cost attributed to the project.
- o Attribution of acquisition expense over project components (per FAR square foot, clinical, research, office, etc.).
- o All hard costs by phase (disaggregated into base building, tenant improvement work, garage, site work, furniture, fixtures and equipment, etc.).
- o All soft costs (disaggregated into individual line items such as architectural, engineering, legal, accounting, and developer's fees, and any other professional fees, insurance, permits, real estate tax during construction, etc.).
- o All contingencies by phase (specify whether contingency is on hard costs, soft cost, or total cost).
- o All assumptions regarding financing terms on acquisition, pre-development, construction and permanent loans, by phase (including financing fees, interest rates, drawdown assumptions, terms, participations, amortization).
- o Calculation of housing and jobs linkage obligations, and anticipated payment method (over term of obligation or on a net present value basis).
- o Any other project-related expenses not within any of the above categories.
- o Calculation of Total Development Cost (TDC) by component, including total and per unit breakdown (e.g., per square foot clinical, research, office, etc.).
- o Sources of debt and equity for total project costs.
- o Projected financing sources, including bond-issuing agencies such as HEFA or MIFA, banks, institutional investors, private, corporate or government donors (an analysis of the costs versus benefits of the financing options, including interest costs and loan term, as well as a comparison of available sources, should be included).

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10-YEAR OPERATING PRO FORMA includes all the information normally found in an operating pro forma, on a yearly basis. This includes, but is not limited to:

- o Tabulation of gross and net (leasable) square feet for all clinical, research, office or other use spaces, if applicable.
- o Schedule of all rents on a per square foot and total basis of space not operated directly by the institution, if applicable.
- o Anticipated operating expenses and real estate taxes on per square foot and total basis, and clear explanation of division of expenses between owner and tenant (includes all commercial space and parking garage), if applicable.
- o All other expense and vacancy assumptions including property management fees, set forth to calculate cash available for debt service.
- o Anticipated leasing patterns (5-year, 10-year, etc.) and lease-up rates, if applicable.
- o Calculation of debt service.
- o For any research space, projections of grant income from government, corporate, philanthropic, or other entities.

Appendix 2

TRANSPORTATION ACCESS PLAN
SCOPE OF SERVICES

MASS. COLLEGE OF PHARMACY

INSTITUTIONAL ACCESS PLAN SCOPE

SCOPE OF WORK

The developer must evaluate the transportation impacts associated with the proposed project. The results of this evaluation will be documented in an Access Plan prepared for submission to the Boston Transportation Department (BTD). The report will include the following:

- A definition of existing traffic, transit, and parking conditions.
- An evaluation of the project's long-term impacts on traffic, transit and pedestrian activities as well as on parking demand, in the context of the College's future transportation policies and goals.
- Identification of appropriate measures to mitigate project impacts, including long-term project impact monitoring.
- An evaluation of the project's short-term traffic impacts related to construction activity.

In the preparation of the Access Plan, use should be made of all available existing studies and data.

STUDY AREA

The following intersections will be studied:

a. Longwood/Huntington
b. Longwood/Palace Rd.
c. Longwood/Ave.Louis Pasteur
d. Longwood/Brookline
e. Ave.Louis Pasteur/Fenway

DEFINITION OF TASKS

Task 1. Description of Existing Transportation Conditions

The Existing Conditions component will present data on the various transportation systems within the study area, and will provide measures of levels of service, available capacity and other analysis as appropriate to identify any current deficiencies in those systems.

1.1 Traffic. Available traffic volume counts will be supplemented with new counts, as necessary. Based on data gathered from all sources, a preliminary base traffic volume network will be developed to represent existing morning, evening and weekend peak hour conditions.

Vehicle-trip generation and modal split characteristics of existing land uses at the project site will be determined by survey.

Capacity analysis will be performed to determine level of service at all study area intersections.

1.2 Parking. Public parking supply, and parking available to current or potential occupants of space in the project or the College, within walking distance of the project site will be defined. The parking inventory will distinguish between on-street (metered and unregulated) and off-street (commercial) spaces. Availability of public spaces will be determined by reference to published sources such as those available from MASCO, supplemented and updated as necessary with survey data.

The existing parking plan for the site will be presented. The inventory of existing on-site parking spaces will include: number of spaces; occupation of spaces by facility, user type, hour of peak occupancy, and turnover rate; rates charged for use; location of any high-occupancy vehicle spaces. Also included will be any available information about current parking accomodations for prospective tenants of the project (Chandler lab, Brigham & Women's).

1.3 Transit. The operating characteristics of the area's private bus carrier services and Massachusetts Bay Transportation Authority (MBTA) services will be documented.

1.4 Pedestrians. Pedestrian conditions on sidewalks and intersections adjacent to the site will be described. Describe major pedestrian corridors to and pathways within the site. Estimate volumes of pedestrians using same. Describe conditions of corridors, including any deficiencies or barriers.

Pedestrian counts will be taken at the following crossings and sidewalk locations:

a. Longwood/Huntington
b. Longwood/Palace Rd.
c. Longwood/Ave.Louis Pasteur

Task 2. Evaluation of Long-Term Transportation Impacts

The traffic impacts of the proposed development will be analyzed in detail. Expected long-term transportation conditions in the

study area will be estimated and evaluated. Impacts of traffic generated by the project will be analyzed in detail and presented in comparison with existing conditions and a "No-Build" scenario, which would represent the situation at the horizon year if the project site were to remain in its current use.

2.1 Trip Generation. The proposed uses of the site will be evaluated to determine the project's person-trip generation characteristics, which will be translated into vehicle trips by use of modal split and vehicle occupancy assumptions consistent with those used for other previously submitted Access Plans for the Longwood Medical Area, or otherwise as approved by the BTD. NOTE: The project site is nearer to the Green Line than any other institution in the Medical Area. Accordingly, transit share projections should be higher than the average for the LMA.

Trip origins should be assigned to appropriate locations on the site (i.e., the location of the driveway for the proposed garage should be reflected in intersection volumes, particularly at Longwood/Palace Rd.).

2.2 Trip Distribution. As with trip generation, trip distribution should be performed specifically for the project site. Estimations should be made of the probable origin of work and non-work trips to the site, on the basis of faculty/staff/student home locations, etc. Trip distribution is most appropriately described in terms of corridor of origin, e.g. Northwest, Southeast, etc.

2.3 Conditions to be Analyzed. In addition to existing conditions, the following future conditions will be analyzed at the Study Intersections:

a. No-Build (with only background projects anticipated to be completed included).

b. Full-Build (with the addition of project-related impacts).

The Build scenario must show the AM, and PM peak hour levels of service at the Study Intersections under each of the roadway alternatives examined.

2.4 Background Development Projects. Any previously approved building construction projects to be included in the No-Build evaluation will be reviewed with Boston Redevelopment Authority and BTD staff prior to the analysis.

2.5 Evaluation of Transportation Impacts. New trips expected to be attracted to the proposed development will be added to demands carried by the existing roadway system plus new trips from background projects. Morning and evening peak hour and daily increases will be developed and analyzed for all travel modes.

2.5.1 Traffic Impacts. Volume-to-capacity ratio (v/c), available reserve capacity (ARC), level of service (LOS) and delay calculations at, and queue lengths between, the study intersections.

2.5.2 Site Circulation. A detailed site plan will be provided, showing proposed location of all vehicular and pedestrian access, drop-off locations, taxi waiting areas, delivery points, and internal pedestria circulation.

2.5.3 Transit. The usage of public transportation will be described, and the impact of the project on transit services.

2.5.4 Pedestrian Impacts. Pedestrian volumes generated by the project will be presented. Future volumes and pedestrian levels of service will be projected for the locations and crossings identified in section 1.4 will be projected. Indicate impact of new pedestrian trips on pedestrian levels of service and amenities.

Pedestrian paths and corridors across and through the project site will be identified on a site plan.

2.5.5 Bicycles. Proposed facilities/programs t accommodate and encourage use of bicycles by occupants of the Project and at the College will be presented.

2.5.6 Trucks and Service Vehicles. Truck and service vehicle traffic to the site will estimated and evaluated. Adequacy of turning radii onto Palace Rd., and of Palace Rd. itself for truck traffic, will be discussed. Access and egress for emergency vehicles will also be evaluated.

2.6 Parking Impacts. Demand for parking generated by the proposed project will be calculated. Parking supply will be identified, for employees, students and visitors. Parking operations will be described in detail, and College policies for management of parking supply will be stated.

2.6.1 Parking demand generated by project by use, both long-term and short-term. On the basis of the traffic volumes projected in section 2.1 above, and using appropriate turnover rates, estimate project-generated parking demand in horizon year. Indicate user type (faculty, staff, student, visitor, patient, R& technician, etc.).

2.6.2 Displacement of existing on-site spaces will be noted, and replacement of same at new off-site locations. Conversely, degree to which proposed on-site facilities will replace existing off-site spaces lost will be identified.

2.6.3 Proposed management plan for parking facilities. Rates for use of spaces will be given. Lease arrangements with parking operators and parking pricing will be detailed.

2.6.4 A plan will be provided of all parking facilities, including layout, access, and size of spaces.

3. Evaluation of Short-Term Impacts (Construction Period)

The transportation assessment will evaluate the impacts of the project during the construction period, including: mode of arrival for construction workers; parking provisions for construction workers and construction materials deliveries; frequency, times and routes of truck movements and construction materials deliveries; temporary storage of construction equipment and materials; the need for full or partial street closures or street occupancy during construction will be defined.

4. Development of Mitigation Measures

Programs or strategies to reduce the transportation impacts will be developed and may include the following:

- Measures to minimize vehicle-trip generation.
- Roadway/traffic operation improvements, e.g., modification of direction of Palace Rd.
- Modification to site access/circulation.
- Transit improvements.
- Parking management improvements.
- Pedestrian/Bicycle improvements.
- Long-term project impact monitoring.

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APPENDIX B

Secretary of Environmental Affairs Certificate on the ENF, March 11, 1993

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street, Boston, 02202

WILLIAM F. WELD
GOVERNOR

ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR

SUSAN F. TIERNEY
SECRETARY

(617) 727-9800

March 11, 1992

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME	:Massachusetts College of Pharmacy and Allied Health Science Project
PROJECT LOCATION	:179 Longwood Avenue, Boston
EOEA NUMBER	:9309
PROJECT PROPONENT	:Massachusetts College of Pharmacy and Allied Health Science
DATE NOTICED IN MONITOR	:February 9, 1993

Pursuant to the Massachusetts Environmental Policy Act (G. L., c. 30, s. 61-62H) and Sections 11.04 and 11.06 of the MEPA regulations (301 CMR 11.00), I hereby determine that the above project requires the preparation of an Environmental Impact Report.

The proposal involves constructing approximately 187,000 square feet (s.f.) of new space to be used for research (~67,000 s.f.) and academic/dormitory uses (~100,000 s.f.). The bulk of the new space will be contained in an eight story building at the rear of the site, across the street from Boston Latin High School. In addition, a one level underground garage for 80-100 cars will be provided and the plan includes demolishing two existing buildings of no historical consequence.

The project will require changes in local zoning in order to be built. The proponent has agreed to comply with the development review requirements of Article 31 of the Boston Zoning Code. The Boston Redevelopment Authority's (BRA) Scope for the Draft Project Impact Report (DPIR) has already been issued.

I am requiring an Environmental Impact Report (EIR) under MEPA primarily because of the sensitivity of the area and concerns that have come forward during the Environmental Notification Form review regarding potential project impact on

such areas as transportation, air quality, historic resources, wind and shadow. I find the BRA Scope adequately identifies the need for analysis of the majority of these issues and hereby adopt it as part of this Certificate, except as the discussion which follows may modify it.

In accordance with Article 31 and policy at MEPA, I encourage the proponent to prepare one document that responds to this Certificate and to the BRA Scope, and to coordinate the timing of submission of the reports to both agencies so that opportunities for public comment are concurrent at the state and local levels.

SCOPE

General

The EIR must generally conform to the outline provided in 301 CMR 11.07; must contain copies of this Certificate and the comments received; and must be distributed in accordance with MEPA Regulation 11.24, and to the following:

- o All who commented on the ENF (A list is provided at the end of this Certificate).
- o Massachusetts Historical Commission
- o MBTA

Transportation

Traffic

A traffic study shall be prepared which conforms to the EOEA/EOTC Guidelines for such studies. The study area must include, at a minimum, the following intersections:

- o Longwood Avenue/Huntington Avenue
- o Longwood Avenue/Palace Road
- o Longwood Avenue/Avenue Louis Pasteur
- o Longwood Avenue/Brookline Avenue
- o Fenway/ Avenue Louis Pasteur

The traffic analysis must also consider traffic from other developments in the area, as well as any planned mitigation by others. Traffic during construction must also be evaluated.

Mass Transit

Due to the sensitivity of the area, the traffic analysis must give special consideration to enhanced opportunities for mass transit and to transit mitigation, as appropriate.

Alternatives

In considering ways to minimize the effect of the 8 story building on Boston Latin High School, either a smaller build alternative or a different massing configuration must be considered, evaluated, and compared to the preferred plan with respect to impacts on the school. The alternative chosen for evaluation should be one which would lessen the need for zoning variances and/or changes in zoning.

Historic

At a minimum, a discussion of the historical context of the immediately vicinity of the project and planned mitigation must be described. Include plans or renderings where appropriate.

Consistency with Local Zoning

A detailed discussion of local zoning requirements must be provided. Compare these requirements to relevant components or aspects of the proposal and the alternative, identifying inconsistencies. Lastly, describe how the project approvals will be sought, given the inconsistencies.

Response to Comments

The EIR must contain a separate section designated for responding to issues raised in comments.

March 11, 1993
DATE

Susan F. Tierney
Susan F. Tierney, Secretary

Attachment: Traffic Guidelines

Comments received :

Boston Latin School Headmaster 3/9/93
MBTA 2/26/93
Boston Environment Department 3/3/93
Boston Water and Sewer Commission 3/1/93
Brookins 3/5/93
BRA 2/17/93

SFT/JIW/jw

APPENDIX C

BRA Preliminary Adequacy Determination on the DPIR, May 21, 1993

Boston
Redevelopment
Authority

Raymond L. Flynn, *Mayor*
Clarence J. Jones, *Chairman*
Paul L. Barrett, *Director*

May 21, 1993

Mr. Louis P. Jeffrey
President
Massachusetts College of Pharmacy
and Allied Health Services

Dear Mr. Jeffrey:

Re: Research/Dormitory College Facility Project

A. Article 31 Development Review: Preliminary Adequacy Determination

This letter is the Preliminary Adequacy Determination (the "Determination") of the Boston Redevelopment Authority (the "BRA") with respect to the Draft Project Impact Report (the "DPIR") for the proposed Research/Dormitory College Expansion Project (the "Proposed Project").

The BRA is issuing this Determination pursuant to the development review requirements of Section 31-5 of the Boston Zoning Code (the "Code"), and as presented by the Institutional Master Plan documentation requirements as defined by Article 51-31.

This Determination requests additional information required by the BRA for its review pursuant to Article 31. Article 31 of the Code, Development Review Requirements, sets out a comprehensive procedure for project review, and requires the issuance of a Final Adequacy Determination prior to issuance of a building permit. The Final Adequacy Determination is issued upon determination by the BRA that the Final Project Impact Report (the "FPIR") is satisfactory.

B. Institutional Master Plan: BRA Comments

Also enclosed are the BRA's comments on the sufficiency of the draft Institutional Master Plan for the Massachusetts College of Pharmacy and Allied Health Sciences and the description of the Proposed project, as contained therein.

One City Hall Square
Boston, MA 02201-1007
Telephone (617) 722-4300
Fax (617) 367-3916

In an effort to standardize Institutional Master Plans, the BRA is using the Institutional Master Plan provisions of Article 51 as a standard for the content and documentation required for Institutional Master Plans. These provisions set out in a manner similar to the Article 31 process the necessary review steps including issuance of an Adequacy Determination by the BRA.

But for the required corrections, clarifications, and additional information referenced in the attached Technical Appendix, the DPIR submitted is sufficient to satisfy the scoping requirements of Article 31.

We look forward to reviewing the Final Project Impact Report and the revised Institutional Master Plan.

Sincerely,

Beverley Johnson
Assistant Director for Institutional
Planning and Development

SLET/08
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TECHNICAL APPENDIX
TO THE
PRELIMINARY ADEQUACY DETERMINATION
FOR
MASSACHUSETTS COLLEGE OF PHARMACY
RESEARCH/DORMITORY/COLLEGE FACILITY PROJECT

DEVELOPMENT REVIEW REQUIREMENTS - ARTICLE 31

Article 31 of the Code institutes a process by which large-scale development projects will be reviewed by the BRA. In its review of the DPIR, the BRA has identified certain components which are insufficient and which the proponent must modify, and additional information which the BRA requires in order to issue a Final Adequacy Determination. The following is a description of the sufficiency of the materials submitted in the DPIR, and the additional materials which the Proponent must include in the FPIR.

I. GENERAL INFORMATION

The general information provided in the DPIR is sufficient to satisfy the scoping requirements with the exception of the presentation on the alternatives, public benefits and financial data.

3.0 Financial Information

Prior to consideration of this project by the Authority, the proponent should submit the financial information requested pertaining to Development and Operating costs.

3.4 Evaluation of Alternatives

The analysis of the alternatives and their relationship to the zoning requirements would be improved with the inclusion of a table. This matrix would clearly show that the preferred alternative most clearly approximates the zoning requirements. It would also indicate how some of the more important constraints in zoning, such as FAR and height, are not being violated by any of the alternatives.

5.0 Public Benefits

The discussion of public benefits focuses to a large extent on current activities being undertaken by the College. A number of new employment and housing related initiatives were presented to the May 4th meeting of the Mission Hill PZAC. These initiatives should be discussed in the Final Project Impact Report.

II. TRANSPORTATION COMPONENT

The information provided in the DPIR with respect to circulation is sufficient to satisfy the scoping requirements. Given the amount of analysis of area conditions which is already available, the BTD takes the position that further analysis of the five study area conditions is not necessary.

Parking, construction impacts, pedestrian and bicycle circulation need, on the other hand, to be addressed further.

The BTD is currently drafting a Transportation Access Plan ("TAP") Agreement for execution between the City of Boston and the Proponent. A TAP Agreement must be substantially finalized prior to the formal issuance of an Adequacy Determination by the BRA.

With respect to parking, the petitioner has identified an existing auto modal share of 63% for the College/ Channing Laboratory employees and 30% for students and a auto occupancy ratio of 1.0. With mitigation the petitioner has proposed an employee auto model share goal of 45% and increased auto occupancy of 1.15 for all users. These goals are ambitious but necessary. A number of strategies including employee transit subsidies, implementation of parking fees and a commuter mobility program are proposed in order to reduce by 37% the number of employees who will drive, from 193 employees to 122, and the number of students who need parking from 179 to 155 (a 13% reduction). Given the limited supply of parking, on the other hand, this mitigation program falls 127 spaces short of the projected supply of a maximum of 150 spaces.

In order to understand the adequacy of and the College's commitment to a proposed mitigation program, the number of students and employees who will be affected by the various proposed mitigation strategies should be identified. In carrying out this analysis, a number of issues need to be identified.

First, the analysis of employees should address mitigation strategies separately for the College and the Channing Lab employees. The commuting patterns for these employees are clearly different. In addition, Channing laboratory employees may be able to continue to park in the Harvard garage. The analysis should therefore separately set forth the auto share and VOR goals for the two classes of employees and the mitigation measures that will be brought to bear on each.

The analysis of student parking demand, furthermore, indicates a demand for spaces which is far in excess of supply. The survey showed that 179 students need parking but that the College will have no more than 50 spaces for the students. Given this shortfall, it would seem appropriate to first identify where the students are parking and second, establish a goal for auto use which is below the 30% current demand estimate. Third a mitigation program which focuses at getting the students to live

nearby, utilize bicycles and to make greater use of public transit should be designed. Specific commitments to reach these and other strategies should be identified. The provision of locker changing facilities and bicycle storage in a secure area should at a minimum be provided.

In order to understand how the proposed mitigation measures will diminish the demand for parking, mode splits (disaggregated by college facility, staff, and administration and channing labs) should be presented for both the unmitigated situation (consistent with Tables III-3.2, III-3.3, and III-3.4) and the mitigated situation. The contribution of each mitigation measure to the change in modal split for each trip maker category should be shown. Mitigation strategies should detail proposed rate structures, transit subsidy percentages and provisions for preferred spaces.

Construction impacts will affect the parking supply as well as pedestrian circulation to Boston Latin. No mention has been made of how the College proposes to address this interim short fall of spaces as well as the impacts upon pedestrian circulation.

The need to provide an adequate pedestrian and bicycle system to and from the College has been clearly stated in the DPIR. Pedestrian counts will be undertaken to clarify desire lines and the adequacy of the existing circulation system. Improved access to Avenue Louis Pasteur and Longwood Avenue for pedestrian and bicycles both during and after the construction phases should be analyzed. Various alternatives need to be considered and wherever possible adopted.

III. ENVIRONMENTAL COMPONENT

The information and analysis provided in the DPIR concerning environmental impacts of the Proposed Project are sufficient to satisfy the scoping requirements with the exception of the following:

1.0 <u>Qualitative Assessment of Pedestrian Level Winds</u>

General: In general, the pedestrian level wind analysis indicates that with the new building, wind conditions will be satisfactory and there should be no exceedences of BRA standards. The major areas of increased windiness are expected to be at the northwest end of the New Building, near the north corner, and at the southeast side of the New Building, near the east corner, where winds uncomfortable for walking may occur. Also, wind conditions degrade along the westerly portion of the Boston Latin School walkway with southwest winds, but since these generally are summer winds, the effect would not necessarily be unpleasant. The DPIR/DEIR notes that landscaping will be planted to reduce winds at the north and east corners of the New Building and at other locations. The FPIR/FEIR should provide more detail on the landscaping mitigation plan (type of

vegetation, etc.) and should include a plan indicating the location of the vegetative plantings.

In section 1.5.1, under Existing Conditions, it should be noted that the area between the White Building and the Newton Building also is quite windy (northwest winds).

2.0 Shadows

General: The shadow analysis indicates that the principal areas affected by new shadows will be the walkway between the project site and the Boston Latin School (primarily from midday on), sections of Palace Road in the afternoon, and the eastern portion of the southerly facade of the Boston Latin School (most particularly in the winter after 3 P.M. when the Latin School students have left). The latter is probably the most serious impact, although the proposed project does generally produce the least impact of the alternatives evaluated. The facade shading diagrams (Figs. IV-2.14 through IV-2.16) clearly represent this impact and are a good presentation.

3.0 Daylight

General: The Daylight Study (IV-3) presented in the DPIR is thorough and meets the requirements of the scope. It is clear that the project, as proposed, is not significantly worse than as-of-right zoning envelopes would allow. The mechanical level should be set back from the building facade plane so that it is not visible from (and therefore would not impact daylight upon) the Boston Latin School walkway.

4.0 Air Quality Analysis

General: A plan indicating the locations of the garage vents and receptor locations for the garage exhaust analysis should be provided in the FPIR/FEIR.

4.3 Space Heating and Steam Facilities

The new boilers will emit considerable amounts of nitrogen oxides, although below State and EPA defined significance levels. Nonetheless, NO_x is a precursor of ozone, for which Massachusetts is in non-compliance. The Clean Air Act Amendments require Massachusetts to attain ozone standards by 1999, which, in turn, will require substantial reductions in NO_x and VOC emissions. Therefore, the FPIR/FEIR should identify State regulatory requirements for the boilers, as well as measures that will be utilized to obtain DEP approval and minimize the emission of NO_x to the maximum extent feasible.

7.0 Geotechnical

7.2 Geotechnical Effects from the Project

The DPIR/DEIR indicates that both the White Building and the LMRC will be underpinned prior to excavation. The FPIR/FEIR should indicate whether there also will be a need to underpin the Boston Latin School adjacent to the project site and if not, the basis for this determination.

IV. URBAN DESIGN COMPONENT

General: The information presented in the DPIR, together with the submission of required schematic documents and supplemental documents, are adequate except for the items listed below which must be addressed in the FPIR which shall also include design changes made since the submission of the DPIR which have resulted from the ongoing BRA and community review process.

A. A landscape design for the front yard (along Longwood Avenue) which maximizes the amount of green space, minimizes car parking area and the number of parked cars, and improves the visual quality of materials in the parking area was approved on May 4th by the BCDC. This plan should be included in the FPIR/FEIR (see also Wind comments above).

B. The floor plans that were included were not fully legible. Clearer plans should be provided in the FPIR/FEIR.

V. HISTORIC RESOURCES COMPONENT

The information provided in the DPIR concerning historic resources is sufficient to satisfy the scoping requirements.

VI. INFRASTRUCTURE SYSTEMS COMPONENT

The information provided in the DPIR concerning infrastructure systems is sufficient to satisfy the scoping requirements, but for the following information which the FPIR must include:

General: The DPIR/DEIR provided estimates of the capacity of the existing sewer and water facilities and of the project's anticipated sewage generation and water demand, but there was no analysis of the adequacy of these utilities under either existing or future local load conditions to accommodate the projected demand. This information must be provided for the FPIR/EIR.

The analysis of energy and electrical demands, including quantification, of the project should also be augmented. Backup and emergency systems should be discussed in the FPIR. These assessments should be included in the FPIR/FEIR.

2.4 <u>System Connections</u>

It is stated that sanitary sewage service from the New Buildings will be connected to the "existing 15-inch sewer under Palace Road". However, Fig. VII-2.1 shows a line of 12-inch and 18-inch diameter in Palace Road. Clarification or correction is needed.

3.1 <u>Water Distribution System: Description</u>

The age and condition of the SLS water mains are cited as concerns arguing against testing. Has their age made the mains weak? Has scaling of the precast iron diminished their actual (vs. theoretical) capacity? The project proponent should discuss these concerns with BWSC and propose mitigation, if appropriate. A report should be made in the FPIR.

3.4 <u>System Impacts</u>

It is noted that the existing SHS water system is capable of meeting the fire fighting requirements of the project. Yet Fig. VII-3.1 does not show any SHS lines in the vicinity of the project site (only SL lines). Clarification or correction is needed.

VII. AGREEMENTS

In addition to completing the Development Review Requirements process, the agreements, plans and documents listed below must be provided in form and content satisfactory to the appropriate signatory public agencies before building permits may be issued for the project:

A. Transportation Access Plan (TAP) Agreement;

B. Traffic Maintenance Plan in conformity with the City's Construction Management Program;

C. Boston Residents Construction Employment Plan, pursuant to Chapter 12 of the Ordinances of 1986 of the City of Boston, as amended by Chapter 17 of said Ordinances, and Executive Order Extending Boston Residents Job Policy, signed by the Mayor on July 12, 1985; and

D. First Source Agreement with the Mayor's Office of Jobs and Community Services.

E. Development Impact Project Agreement pursuant to Article 26-26B of the Zoning Code.

F. Cooperation Agreement.

APPENDIX D

Secretary of Environmental Affairs Certificate
on the DEIR, May 14, 1993

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street, Boston, 02202

WILLIAM F. WELD
GOVERNOR

ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR

TRUDY COXE
SECRETARY

Tel: (617) 727-98
Fax: (617) 727-27

May 14, 1993

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS ON THE DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	:	Massachusetts College of Pharmacy & Allied Health Sciences Project
PROJECT LOCATION	:	Longwood Avenue, Boston
EOEA NUMBER	:	9309
PROJECT PROPONENT	:	MA College of Pharmacy & Allied Health Sciences
DATE NOTICED IN MONITOR	:	April 7, 1993

The Secretary of Environmental Affairs herein issues a statement that the Draft Environmental Impact Report (DEIR) submitted on the above project adequately and properly complies with the Massachusetts Environmental Policy Act (G. L., c. 30, s. 61-62H) and with its implementing regulations (301 CMR 11.00).

The proposal involves constructing approximately 187,000 square feet (s.f.) of new space to be used for research (~67,000 s.f.) and academic/dormitory uses (~100,000 s.f.). The bulk of the new space will be contained in an eight story building at the rear of the site, across the street from Boston Latin High School. In addition, a one level underground garage for 80-100 cars will be provided and the plan includes demolishing two existing buildings of no historical consequence.

The DEIR has been distributed in accordance with requirements under MEPA and as a Draft Project Impact Report (DPIR) under Article 31 of the Boston Zoning Code.

Generally the report responds well to issues raised in the Scope. However, there are areas of the report that warrant further attention in the Final Environmental Impact Report (FEIR) as are discussed below and in comment from the Boston Environment Department; the Department of Environmental Protection, Division of Air Quality Control; and the MBTA.

Alternatives Analysis

The DEIR demonstrates that an alternative massing scheme h been considered that would have less impact on the Boston Latin School in accordance with the Scope. This alternative has been suggested as having a dramatically greater visual impact from Longwood Avenue than would the preferred alternative. The preferred alternative (Alternative B, depicted in Figure I-3.9) and the alternative prepared in response to the Scope (Alternative C, Figure I-3.12) are actually hard to compare because the level of detail provided is not comparable in each rendering. Thus, the FEIR must provide an architectural rendering of Alternative C with more detail similar to that fou in Figure 1-3.9.

This request for additional detail is made solely for the purpose of providing a fair comparison of alternatives. I recognize that the limited shadow mitigation gained by Alternative C may not be sufficient to overcome the increased wind impacts and programmatic negatives associated with this alternative. I am nonetheless concerned that the suggested negative visual impact of Alternative C may be overstated.

Traffic

Further mitigation measures related to traffic will need t be developed and described in the FEIR. The FEIR must clearly depict the number of parking spaces associated with the project Consider providing a net decrease in the total number of parkin spaces on the site as has been discussed in comments and as is alluded to in the DEIR. Develop other possible ways to enhanc the Transportation Demand Management strategies provided in the DEIR.

Air Quality

Address concerns of the Division of Air Quality Control for the air quality analysis and the mitigation in the FEIR.

May 14, 1993
DATE

Trudy Coxe
Trudy Coxe, Secretary

Comments received :

Department of Environmental Protection, DAQC, May 7, 1993
Boston Environment Department, May 3, 1993
Massachusetts Bay Turnpike Authority 4/29/93
Harvard Medical School 5/6/93
Executive Office of Economic Affairs 5/7/93
Massachusetts College of Art 5/4/93
Boston Water and Sewer Commission 5/7/93
Building and Construction Trades Council of the Metropolitan District 5/3/93

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

William F. Weld
Governor
Daniel S. Greenbaum
Commissioner

RECEIVED
MAY
MEPA

MEMORANDUM

TO: Secretary Coxe, Executive Office of Environmental Affairs

ATTN: Jacki Wilkins, MEPA

FROM: Christine Kirby, DEP

DATE: May 7, 1993

SUBJECT: EOEA No. 9309 - Review of the DEIR for the Massachusetts College of Pharmacy and Allied Health Sciences in Boston

The Department of Environmental Protection (DEP) Division of Air Quality Control has reviewed the Draft Environmental Impact Report (DEIR) for the Massachusetts College of Pharmacy and Allied Health Sciences in Boston and offers the following comments. The DAQC recommends using background CO values are 5 ppm for the one hour scenario and 3 ppm for the eight hour scenario when conducting a microscale analysis. The data provided for the 1998 build scenario indicates that mitigation will be needed to ameliorate CO exceedances at sensitive receptors B4,B5 and B7 located at the intersection of Brookline/Longwood Avenue. Mitigation can be achieved by implementing principles of Transportation Demand Management (TDM) such as providing transit passes for students and employees and instituting an employee ridesharing program.

Should you have any questions regarding this memorandum please contact Keith Grillo of the Division of Air Quality Control at 292-5630 ext. 5773.

mepa

Harvard Medical School

25 Shattuck Street
Boston, Massachusetts 02115
(617) 432-0943
(617) 432-2596 - FAX

Kathryn E. West
Associate Dean for Operations

May 6, 1993

RECEIVED
MAY
MEPA

Honorable Trudy Coxe
Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, MA 02202

Re: Massachusetts College of Pharmacy & Allied Health Sciences Project
DPIR/DEIR - EOEA #9309

Dear Secretary Coxe:

On behalf of Harvard Medical School, I am writing to comment on the DPIR/DEIR submitted by the Massachusetts College of Pharmacy and Allied Health Sciences outlining the proposed development program at its campus at 179 Longwood Avenue in Boston, Massachusetts.

Harvard Medical School is an institutional abutter of the College and as such has received a full briefing on the project by representatives of the College. As a result of our review of the project, it is our opinion that the proposed project is sustainable at the site, is in keeping with objectives of the College, and has no negative environmental impacts of significance. The traffic and parking management plan, the construction management plan and the mitigation measures for daily operations which are outlined in the DPIR/DEIR are more than sufficient to mitigate any impacts of the project.

We applaud our neighboring institution's efforts to remain current and upgrade its facilities and the thoughtful manner in which the project has been undertaken. We urge you to grant their approvals with all due expedience.

Sincerely,

Kathryn E. West

May 3, 1993

RECEIVED
MAY
MEPA

City of Boston
The Environment Department

Raymond L. Flynn
Mayor

Lorraine M. Downey
Director

Boston City Hall Room 805
Boston Massachusetts 02201
617-635-4416 or 635-3850

Secretary Trudy Coxe
Executive Office of Environmental Affairs
100 Cambridge St. 20th Floor
Boston, MA 02202

Attn: Jacki Wilkins, MEPA Unit
RE: EOEA #9309, Massachusetts College of Pharmacy New Building and White Building Renovation, Boston (Longwood)

Dear Secretary Coxe:

The City of Boston Environment Department has reviewed the Draft Project Impact Report/Environmental Impact Report (DPIR/DEIR) for the proposed project referenced above and hereby submits the following comments in response:

The DPIR/DEIR adequately addresses the concerns raised by the review of the ENF, and adequately conforms to the scopes issued by MEPA and the Boston Redevelopment Authority (BRA). The DPIR/DEIR also presents a convincing argument that the preferred alternative (Alternative B) most effectively minimizes environmental impacts on surrounding structures.

Nonetheless, several concerns await resolution in the FPIR/FEIR. The issues of parking remains confusing and in need of further mitigation. Page V-1.3 states that 100 of the surface parking spaces on site will be replaced by 80-100 subsurface spaces in the future, implying a decrease of up to 20 spaces on site. However, table V-1.1 lists 100 subsurface spaces as a definitive number. Page VI-4.1 again uses the 80-100 parking space range, while at other points the garage function is noted as replacement parking, implying that the actual number of spaces proposed in the garage will be 100.

The FPIR/FEIR should commit to a definite number of parking spaces, preferably 50 above ground spaces in landscaped lots and 80 below grade spaces in the garage. This would result in a net decrease of 20 parking spaces over the current situation, and should be considered a reasonable mitigation measure for current and future traffic impacts. Currently, 78.3% of the faculty access the site via private auto. Improving the transit/bicycle modal split among faculty would allow for a reduction in parking spaces. Transit subsidies for faculty and employees and high parking fees are proven methods of reducing demand for parking spaces.

Shadow impacts and daylight obstruction on the adjacent Boston Latin School continue to be a source of concern. These impacts have been reduced since the submission of a Project Notification Form to the BRA in January, but will still be noticeable (especially during school hours) when school is in session.

The noise analysis is adequate, and the Environment Department concurs with the selection of the business standard as most appropriate for abutting uses. The proponent should design mechanical features of the building with the goal in mind of compliance with the business standard as measured from the vertically extended property lines of adjacent sites.

The current recycling program of the College is admirable, and should be expanded beyond paper and cardboard collection. The design of the loading dock should incorporate ample space for an expanded recycling initiative. The FPIR/FEIR should firm up the commitment on p. IV-8.3 to expand recycling activities.

In conclusion, the DPIR/DEIR is generally well-written and answers most concerns with the proposed project adequately. The FPIR/FEIR should clarify the mitigation of traffic and parking impacts and should also include feasible and creative mitigation measures for impacts on the adjacent Boston Latin school.

I thank you for your time and consideration.

Sincerely,

L M Downey

Lorraine M. Downey
Director

LMD/AP:ap

cc: Beverly Johnson, BRA
Mitchell Fischman, HMM

The Commonwealth of Massachusetts
Executive Office of Economic Affairs
One Ashburton Place -- Room 2101
Boston, MA 02108

WILLIAM F. WELD
Governor

ARGEO PAUL CELLUCCI
Lieutenant - Governor

STEPHEN P. TOCCO
Secretary

TELEPHONE
(617) 727-8380

FACSIMILE
(617) 727-4426

RECEIVED
MAY 7 1993
MEPA

May 7, 1993

Honorable Trudy Coxe, Secretary
Executive Office of Environmental Affairs
Commonwealth of Massachusetts
100 Cambridge Street, 20th Floor
Boston, Massachusetts 02202

Attn: MEPA Unit - - Jacki Wilkins

Re: EOEA # 9309, Massachusetts College of Pharmacy and Allied Health Sciences Project, 179 Longwood Avenue, Boston, MA

Dear Secretary Coxe:

I am writing to express the support of the Executive Office of Economic Affairs for the Massachusetts College of Pharmacy and Allied Health Sciences Project, which is the subject of a DEIR/DPIR currently undergoing review by your office. This project will be a significant component of the Longwood Medical Area, and will further the goals of scientific research, care, and education. The Project will insure the continued preeminence of the City of Boston in the field of health care, and provide significant economic benefits to the City and the Commonwealth.

Please record the support of the Executive Office of Economic Affairs for this project.

Sincerely

Stephen P. Tocco
Secretary

MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY

Planning and Budget
Ten Park Plaza, Boston, MA 02116

RECEIVED
MAY 1993
MEPA

April 29, 1993

Trudy Coxe, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, Massachusetts 02202

Attention: Jacki Wilkins
MEPA Unit

Subject: Massachusetts College of Pharmacy and Allied Health Sciences
Draft Project Impact Report/Draft Environmental Impact Report (DPIR/DEIR)
EOEA File No. 9309

Dear Secretary Coxe:

The Massachusetts Bay Transportation Authority (MBTA) has reviewed the DPIR/DEIR for the Massachusetts College of Pharmacy and Allied Health Sciences project on Longwood Avenue in Boston. The proposed development will include the construction of approximately 187,000 gross square feet of new space which is designed to improve and consolidate facilities and a new below grade parking garage for approximately 100 cars. There will be no increase in the overall number of parking spaces at the site. Listed below are the areas of concern to the MBTA.

The MBTA is pleased the developer has reduced the proposed number of on-site parking spaces to equal the number currently existing on the site. This should be of some help for the Huntington/Longwood Avenue intersection by not exacerbating an already inadequately operating intersection. However, the intersection will continue operating at Level of Service (LOS) F during both the AM and PM peak periods. While the LOS remains at F in both the build and no-build models, the MBTA hopes the developer would offer assistance for potential mitigation measures at this intersection. The MBTA operates Bus Route 39 through this intersection. This bus route, along with other traffic (including Massachusetts College of Pharmacy and Allied Health Sciences traffic) experiences a delay of over three minutes at this intersection.

Thank you for the opportunity to submit these comments.

Sincerely,

Victoria R. Marks
Project Manager

JSO'B/lea

JW

Boston Water and Sewer Commission

425 Summer Street
Boston, MA 02210-1700
617-330-9400
Fax 617-330-5167

RECEIVED
MAY 1993
MEPA

May 7, 1993

Ms. Trudy Coxe, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, MA 02202

Attn: MEPA Unit

Re: Massachusetts College of Pharmacy
New Building DEIR
EOEA No. 9309

Dear Secretary Coxe:

The Commission has reviewed the Draft Environmental Impact Report (DEIR) for the Massachusetts College of Pharmacy and Allied Health Sciences Project proposed at its site at 179 Longwood Avenue in the Longwood Medical Area section of Boston.

The proponent proposes to attach the New Building to the rear of the existing White Building. The New Building is designed to accommodate classrooms, faculty offices, laboratories, research space and housing for 175 to 180 students. A new below grade parking garage for 80 to 100 cars will be located under the New Building. The proponent also proposes to renovate the existing White Building.

The Draft Environmental Impact Report states that the average daily water consumption will be 64,230 gallons per day (gpd) which includes the peak makeup water requirement of 20,000 gpd. The wastewater generated by this project is estimated at 40,012 gpd.

The Commission has spoken to the proponent about the Commission's plans to replace sewers on Palace Road, adjacent to the project site. This summer the Commission will begin to replace most of the sanitary sewer and storm drains on Palace Road. The proponent can contact the Commission so that arrangements can be made with the Commission's contractor to connect the proponent's sanitary and stormwater lines to the new pipes.

In Section 3.5- System Connections, the DEIR states that fire protection service is available from the 42 inch SHS water main on Huntington Avenue. The proponent is advised that a direct connection to the 42 inch water main in Huntington Avenue will not be permitted. The proponent should discuss alternatives with the Commission.

Thank you for the opportunity to comment on this project.

Yours truly,

John P. Sullivan. Jr., P.E.
Chief Engineer

JPS/PK/mo

cc: Benjamin Hershenson - MCPAHS
Patrick J. Foley, BWSC
Stephan Shea, BWSC
Susan Norton, MWRA

Building and Construction Trades Council of the Metropolitan District

AFFILIATED TO THE

BUILDING AND CONSTRUCTION TRADES DEPARTMENT

AFL-CIO

TERRITORIAL JURISDICTION

Arlington, Boston, Belmont, Brookline, Burlington, Cambridge, Canton, Chelsea, Dedham, Everett, Malden, Medford, Melrose, Milton, Norwood, Reading, Revere, Somerville, Stoneham, Wakefield, Westwood, Winthrop, Winchester, Woburn, and the Islands of Boston Harbor

TELEPHONE
617 - 282-0080

645 MORRISSEY BOULEVARD
SUITE 2
BOSTON, MA 02122-3520

RECEIVED
MAY 1
MEPA

May 3, 1993

Honorable Trudy Coxe
Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston,MA 02202

Re: Massachusetts College of Pharmacy & Allied Health Sciences
Project DPIR/DEIR - EOEA #9309

Dear Secretary Coxe,

On behalf of the Boston Building Trades, I am writing to comment on the DPIR/DEIR submitted by the Massachusetts College of Pharmacy & Allied Health Sciences, for its proposed building program at 179 Longwood Avenue.

I have had occasion to meet with project proponents and received a briefing on the project plans. It is my assessment that no significant environmental impacts will result from the project,and that comprehensive mitigation measures are planned for both construction management, traffic and parking management. Representatives of the College have committed to make this a union construction project.

This is the type of project which should go forward through permitting with all due speed. It is good for the City of Boston, the institutional/health care community and Boston's Building Trades can benefit as well. I urge you to grant the approvals requested by the Massachusetts College of Pharmacy & Allied Health Sciences. We look forward to an early start to construction.

Sincerely,

Joseph W. Nigro

Joseph W. Nigro,Jr.
General Agent/Secretary Treasurer
Boston Building Trades Council

621 Huntington Avenue
Boston, Massachusetts 02115-5882
617.232.1555

RECEIVED
MAY
MEPA

mepa

MASSACHUSETTS COLLEGE OF ART 1873

May 4, 1993

Secretary Trudy Coxe
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, MA 02202

Re: Massachusetts College of Pharmacy & Allied Health Sciences Project
DPIR/DEIR - EOEA #9309

Dear Secretary Coxe:

On behalf of the Massachusetts College of Art, I am writing to comment on the Massachusetts College of Pharmacy and Allied Health Science's development project at its campus at 179 Longwood Avenue in Boston, Massachusetts. We have received and reviewed the DPIR/DEIR for the project, EOEA #9309, and have been provided with a full briefing on the proposal by the representatives of the College.

After thorough review, it is our assessment that the project has no significant negative environmental impacts. Moreover, we have received the commitment of the College to work with us on coordination of street and infrastructure repair work on Palace Road. The development is well designed and the DPIR/DEIR report outlines a comprehensive plan for mitigation of impacts related to traffic and parking management, construction management, and operation.

We encourage you to grant the Massachusetts College of Pharmacy the approvals it seeks.

Sincerely,

William F. O'Neil

William F. O'Neil
President

WFO/jb

APPENDIX E

Erosion Study For Pedestrian Level Wind Analysis

WIND TUNNEL STUDY OF PEDESTRIAN LEVEL WINDS FOR THE PROPOSED MASSACHUSETTS COLLEGE OF PHARMACY AND ALLIED HEALTH SCIENCES ALTERNATIVE B BUILDING

VOLUME I
MAIN TEXT AND APPENDICES

WBWT-TR-1294 MAY 1993

BY

FRANK H. DURGIN P.E.

SUBMITTED TO:
HMM ASSOCIATES, INC.
196 BAKER AVENUE
CONCORD MASSACHUSETTS 01742

ATTENTION MR. MITCHELL FISCHMAN

FROM:
THE WRIGHT BROTHERS FACILITY
DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE MASSACHUSETTS 02139

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A WIND TUNNEL STUDY OF PEDESTRIAN LEVEL WINDS FOR THE PROPOSED MASSACHUSETTS COLLEGE OF PHARMACY AND ALLIED HEALTH SCIENCES ALTERNATIVE B BUILDING

by

Frank H. Durgin P.E.

1. INTRODUCTION

An erosion technique has been used in a wind tunnel test to obtain estimates of the occurrence of pedestrian level winds (PLWs) at 28 stations near the proposed Massachusetts College of Pharmacy and Allied Health Sciences Alternative B Building (MCPASB). The site is at the north corner of the intersection of Longwood Avenue and Palace Road in Boston, Massachusetts. Predicted 100-hour return period equivalent average wind speeds were obtained at each of the 28 locations covering the site and surrounding area.

The study was performed in the Wright Brothers Facility (WBF) wind tunnel of the Department of Aeronautics and Astronautics at the Massachusetts Institute of Technology. The erosion technique produces semiquantitative predictions of return period wind speeds at any number of locations and is used to insure that no excessively windy places are missed. The results provide a way of comparing the relative windiness of each of the 28 stations and, using Melbourne's Criteria (see Section 5) an evaluation was made of the types of pedestrian activities that most people would perceive as comfortably possible at each location.

The results of this study are presented in Table 3 and Figures 8 through 12 and can be summarized as follows:

1) No station considered in the test had annual or seasonal predicted winds that exceeded the Boston Redevelopment Authority (BRA) guideline wind speed, or fell within Melbourne's Category 1, unacceptable and dangerous.

2) Only one station (8 at the north corner of the MCPASB) had annual predicted winds that fell into Melbourne's Category 2, uncomfortable for walking. Seasonally, station 8 had predicted PLWs that were in Category 2 for the winter, spring, and fall seasons. Station 10 (next to 8 along the northwest wall of MCPASB) also had predicted PLWs that fell in Category 2 in the winter. No significant pedestrian traffic is expected near stations 8 and 10. All other locations are categorized as acceptable for walking or other activities.

3) Predicted annual PLWs at the existing main entrance to the MCPSAB are in Category 3, comfortable for walking. Those at the new east and west entrances are predicted to be in categories 5 and 4 (comfortable for long and short periods of standing or sitting), respectively.

Basic information about the experimental equipment, the acquisition and reduction of data, and the evaluation of the results is included in the main body of the text. The appendices included in the main text provide additional technical material on the methods and procedures used. The photographs of the eroded particles for this study are contained in Volume II, which is available for review on request. The erosion wind speeds, annual and seasonal Weibull constants, and annual percent contributions for each of the 16 wind directions used are provided in the appendices in Tables A1 to A7 in Volume I. For quick reference, Table 3 and Figures 8-12 were prepared to summarize all the data used in the evaluation of the results.

Information about the wind tunnel, the approach flow used, the test equipment, and the test model used is given in Section 2 and discussed further in Appendices I and II. Section 3 provides an in-depth explanation of the erosion technique. The methods of data reduction used are presented in Section 4 and discussed in more detail in Appendix III. The BRA guideline wind speed and Melbourne's Criteria are discussed in Section 5 and Appendix IV. Results are presented in Section 6, discussed in Section 7, and summarized in Section 8.

2.0 THE EXPERIMENTAL EQUIPMENT

2.1 THE WIND TUNNEL AND APPROACH FLOW

All testing was conducted in the Wright Brothers Memorial Wind Tunnel (WBWT), a diagram of which is shown in Figure 1. Although this wind tunnel was designed primarily for aeronautical testing, relatively simple modifications allow it to be used for pedestrian level wind studies, such as that performed for this MCPASB study.

Due to resistance to the wind created by the ground, trees, buildings, and other obstructions near ground level, the wind speed at pedestrian level is not the same as the wind speed at greater heights. Thus the wind speed, which must be zero at the ground surface, increases exponentially up to a height of 900 to 2000 feet, depending on the type of terrain upwind of the site. The region in which the wind speed increases with height is commonly referred to as 'The Atmospheric Boundary Layer', and the 900-2000 foot height, above which the wind speed is constant, is called the 'Gradient Height'. The atmospheric boundary layer, sometimes called the 'approach flow', is modeled in the wind tunnel using spires and roughness blocks placed on the test section floor upstream of the modeled part of the city, as shown in Figure 2. Given the nature of the MCPASB site and its surrounding area, a suburban type approach flow was used. The resulting atmospheric boundary layer was measured in the wind tunnel and found to be appropriate for this test. An in-depth discussion of this boundary layer is presented in Appendix II.

2.2 THE MODEL

The approach flow was created as the wind passed over the spires and roughness blocks and simulated the expected atmospheric boundary layer upwind of the model of the MCPASB. The model scale was 1-384. Usually, an 8 feet in diameter model of the site and surrounding area would be constructed at that scale to insure that the appropriate interference between the building of interest and its surroundings is simulated. However, in this case, only a 2 by 3 foot rectangular section near the MCPASB was modeled (see Figures 3 and 4).

From an earlier qualitative assessment of PLWs at the site, it was determined that the east and north corners of the MCPASB would be the windiest areas and that northwest and northeast winds would cause that windiness. For those directions, this smaller model, with the addition of a model of the Boston English School Building just off the modeled area, is believed to provide adequate simulation of the surrounding area. Indeed, the data confirms this assumption in that both those corners are the windiest areas and further it is the northeast and northwest winds that cause the windiness.

Figure 3 is a drawing of the model and turntable showing the modeled area and the location of each of the 28 stations. Figure 4 contains two photographs of the model in the wind tunnel.

2.3 TEST EQUIPMENT

All pictures of the erosion process were taken from two cameras mounted about one foot apart directly over the model. Use of two cameras assured that no station would be obscured by a tall building. Also, if one camera did not work the second one probably would, as happened for several pictures.

3. THE EROSION TECHNIQUE

The erosion technique provides a means of qualitatively measuring wind speeds in the vicinity of a project and has been extensively used over the last 10 years at WBF [2, 13, 14, 16-18, 21-25, 27, 28, 40, 45, and 46]. To perform such tests, colored rice-like plastic particles are spread one layer thick over all areas of interest in the model. Two cameras are mounted about one foot apart at the top of the wind tunnel, facing down toward the model. Pictures of the model are then taken at wind tunnel gradient wind speeds of 0, 10, 13, 17, 23, 30, and 40 mph. This process is repeated for each of 16 wind directions (NNE, NE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW, and N). From these sets of pictures it is possible to determine the approximate wind speed at which the particles were swept away from each of the 28 locations evaluated. For example, the windiest places are those at which the particles are swept away at the lowest gradient height wind speeds (10-17 mph), while locations that are still covered at 40 mph are relatively calm locations.

Listings of the gradient height wind speeds at which the particles were swept away from each of the 28 locations at each of the 16 wind directions are given in Table A1 for the Alternative B Building tested.

Although the results from the erosion study have been used to obtain estimates of the return period pedestrian level wind speeds, the primary purpose of these tests was to obtain qualitative estimates of expected Melbourne Categories and to determine if PLWs at any station could be expected to exceed the BRA guideline wind speed.

4.0 REDUCTION OF DATA

4.1 INTRODUCTION

The primary data from this erosion study consists of the sets of photographs taken of the eroded particles which appear in Volume II, which is available for review on request. It contains 224 different photographs, one from each of two cameras showing the erosion effects at each of the 7 wind speeds for each of 16 directions.

While all the information is contained in the photographs, it is hard to evaluate the actual PLWs at each station by just looking at them. To determine the predicted occurrence of PLWs at each station, the photographs were examined to determine the gradient wind speed at which each location became free of particles. Those wind speeds are listed in Table A6.

4.2 THE EQUIVALENT AVERAGE

A high average wind, high gustiness, or an infrequently occurring strong gust can make a location be perceived as windy. The 'equivalent average wind speed' concept was developed as a single quantity that included the effects of each of these types of wind and could be used in the evaluation of pedestrian level winds measured in hot-wire studies.

In a typical hot-wire study, the 100 hour return period average, effective gust, and peak gust are determined for each location considered. The 'equivalent average wind speed' originally was defined as the largest of: 1) the average wind speed; 2) the effective gust speed divided by 1.4; and 3) the peak gust wind speed divided by 1.9.

If the predicted average, effective gust, and peak gust wind speeds are obtained for many stations, 1.4 is the average of the ratios of effective gust to average wind speed, and 1.9 is the average of the ratios of peak gust to average wind speed [13]. Thus for the 'average' station the three quantities defined above would be equal.

However, recently [13], it was found that, if the 'equivalent average wind speed' is to conform with the results of Hunt et al. [31] and Murakami et al. [39], then one should divide the predicted average by 1.10, the predicted effective gust by 1.43. and the predicted peak gust by 1.88 and pick the highest of these. The reasoning behind this change stems from two facts: both groups found steady average winds to be less annoying than gusty winds, but that spatial variations of average winds are important; and Murakami found that the apparent crossover between average winds and gusting was at about 20% turbulence [13, 31, 39].

Defined in this way the 'Equivalent average' accounts for high average winds, gusting winds, and rarely occurring peak gusts. Also, because Melbourne's Criteria for pedestrian level winds was derived for peak gust winds and then converted to apply to average winds, it is believed that the predicted equivalent average winds can be used with his criteria.

Finally, in references [16] and [13] it is shown that when an equivalent average wind speed of 9.1 mph is assumed for the wind speed at which the particles erode, the standard deviation between hot-wire and erosion results is minimized for a model scale of 1-600. 10 mph was used in this study to account for the different scale and relative particle height.

5.0 CRITERIA

5.1 THE BRA GUIDELINE WIND SPEED

In order to evaluate the impact of pedestrian level winds, wind speed criteria or guidelines are necessary. The BRA uses a 100-hour return period effective gust guideline wind speed of 31 mph. The effective gust is defined as the average wind speed plus 1.5 times the rms (root mean square variation about the average) wind speed. This effective gust wind speed is referred to as the BRA guideline wind speed. The 31 mph effective gust roughly corresponds to the fastest 1-minute gust that occurs about once each 100 hours.

To convert the BRA guideline effective gust wind speed of 31 mph to an equivalent average wind speed as used in this report, the 31 mph must be divided by 1.43, which gives a value of 22 mph. Thus any predicted 100-hour return period wind speed that exceeds 22 mph also exceeds the BRA guideline wind speed. In this study no station exceeds the BRA guideline wind speed.

5.2 MELBOURNE'S CRITERIA

The other wind speed criteria used to evaluate pedestrian level winds in this study are those developed by W. H. Melbourne [34]. In 1978, Melbourne conducted a literature review to find a probabilistic criteria for pedestrian level winds that would reflect different types of human activity as well as safety considerations. The results of that study are summarized in Figures 7 and A9. The criteria are described in detail in Appendix IV. The vertical scale in Figure 7 is the equivalent average hourly wind speed as defined above in mph, and the horizontal scale is the probability of that wind speed occurring based on the number of hours. Five comfort criteria are given. They are : 1) 'Unacceptable and dangerous'; 2) 'Uncomfortable for walking'; 3) 'Acceptable for walking'; 4) 'Acceptable for short periods of exposure for standing or sitting'; and 5) 'Acceptable for long periods of exposure for standing or sitting'.

These criteria, as defined for 100-hour return period wind speeds have been in use at the WBF since 1979, and since 1985 have been applied to 100-hour return period equivalent average wind speeds. Melbourne's Criteria, when the horizontal scale is limited to a minimum probability of occurrence $P(U>Up) = 0.001$ (1000 hours), are given in Figure 7. The corresponding BRA guideline wind speed is also identified in Figure A9 by a circumscribed star symbol.

Melbourne's Criteria cover all probabilities, as shown in Figure 7. Considering winds with a 100-hour return period (1 percent probability) occurrence, his criteria can be restated in tabular form as follows:

TABLE 1

MELBOURNE'S CRITERIA FOR 100-HOUR RETURN PERIOD
EQUIVALENT AVERAGE WIND SPEEDS

CATEGORY	DESCRIPTION	WIND SPEED
1	UNACCEPTABLE-DANGEROUS	$U_{eqav} \geq 27$
2	UNCOMFORTABLE FOR WALKING	$27 > U_{eqav} \geq 19$
3	ACCEPTABLE FOR WALKING	$19 > U_{eqav} \geq 15$
4	STATIONARY SHORT EXPOSURE	$15 > U_{eqav} \geq 12$
5	STATIONARY LONG EXPOSURE	$12 > U_{eqav}$

Melbourne's Criteria are subjective and expressed in probabilistic form. They are based on the work of eight authors. The criteria in the table above suggests that if the 100-hour return period equivalent average wind speed exceeds 27 mph, the wind at that location will exceed 27 mph often enough to make that location dangerous. Similarly, if the 100-hour return period wind speed is less than 12 mph, then that location will not seem windy at all, and one can stand or sit comfortably for long periods of time except on very windy days.

The equivalent average wind speeds defined in Appendix IV are compared with Melbourne's Criteria for average wind speeds to evaluate the results of this erosion test (see Table 3). Both the predicted 100-hour wind speeds and resulting Melbourne categories are given for each station in that table. Those same results are given on maps of the area in Figures 8 through 12. An asterisk would appear next to any predicted wind speed or category in both the table and maps if the predicted equivalent average wind speed exceeded the BRA guideline wind speed in equivalent average form (none do).

The dotted line in Figure A9 shows the estimated wind conditions at an elevation of 4.5 feet at Boston's Logan Airport. Note that the dotted line lies above Melbourne's Category 3, acceptable for walking, and slightly below the BRA guideline equivalent average wind speed of 22 mph. This means that wind conditions in the open at Logan Airport would be termed uncomfortable for walking by Melbourne's Criteria, but would be acceptable by the BRA guideline.

In order to provide some basis for the wind speeds in Table 3 and Figures 8 to 12, Table 4 has been provided. This table is based on Admiral Beaufort's wind scale, as interpreted by Penwarden [41], for pedestrian level winds. The wind speeds used in the table appear to be defined similarly to the effective gust wind speed used by the BRA, as indicated in the footnote. Thus they are about 1.3 times the equivalent average used in this report. The 100-hour return period guideline effective gust wind speed of 31 mph used by the BRA is at the dividing line wind speed between Beaufort's Categories 6 and 7. Melbourne's dividing line wind speed between Category 3, acceptable for walking, and Category 2, uncomfortable for walking, is 19 mph. When multiplied by 1.3 it becomes an effective gust of 25 mph, and falls in the middle of Beaufort's Category 6.

6. DESCRIPTION OF RESULTS

The primary results of this pedestrian level wind study of the MCPASB are the photographs contained in Volume II (available for review on request). Those photographs have been read to obtain the gradient wind speed at which each station became free of particles for each of the 16 directions tested. Those readings are given in Tables A1. Volume II contains all the photographs taken with cameras I (35 mm lens) and II (100 mm lens) for the configuration tested. There are five original copies of Volumes II.

The readings given in Tables A1 have been used as described in Appendix III to obtain the estimates of the annual 100-hour return period wind speeds and Melbourne's Categories for each of the 28 stations considered. The results are presented in Table 3 and shown in Figures 8 through 12. The predicted 100-hour return period wind speeds and Melbourne's Categories for each station and season considered are compared in Table 3.

Table AB gives the percent contribution of each wind direction to the annual total 1% probability of the predicted 100-hour return period wind speed for each station. They are included to enable one to determine the wind directions which contribute the most to the total 1% probability of the predicted wind occurring. Then knowing that NW winds prevail in the winter, SW winds prevail in the summer, and easterly winds occur during storms, one can determine if and when any windiness at a station will effect its use. Knowing which wind directions are the primary cause of any windiness, it is often possible to then determine how to reduce that windiness.

7. DISCUSSION OF RESULTS

Examination of the results presented in Table 3 shows that no station has winds that exceed the BRA guideline equivalent average wind speed of 22 mph. Further, only two stations, 8 and 10, have predicted wind speeds that ever fall in Melbourne's Category 2, uncomfortable for walking. Station 8 is in Category 2 annually and in winter, spring and fall. Station 10 is only in Category 2 in the winter. All other stations fall in Categories 3, 4, and 5. Table 2 below lists the number of stations in each category annually and for each season.

TABLE 2

NUMBER OF STATIONS IN EACH CATEGORY BY SEASON

CATEGORY	ANNUAL	WINTER	SPRING	SUMMER	FALL
1	0	0	0	0	0
2	1	2	1	0	1
3	6	11	9	0	5
4	11	7	10	9	11
5	10	8	8	19	11

From Table 2 one can see that winter will be the most windy season and summer the least.

Stations 7 and 9 are nearly as windy as stations 8 and 10, but the windiness at 7 and 9 never exceeds that of high Category 3. Actually, the windiness at these two sets of stations is about the same due to NE winds, but NW winds also contribute to the windiness at stations 8 and 10 making them a little windier. Fortunately, neither of these areas will be subject to any significant pedestrian traffic. The area near stations 8 and 10 would only be used by pedestrians coming from the Boston Latin School parking lot and it is very unlikely any people entering the MCPASB would use that lot. Stations 7 and 9 are in the entrance and exit areas for vehicular parking and again one would expect very little pedestrian traffic near either station. The erosion photographs for NNE, NE and ENE winds seem to indicate that the other side of Palace Road in that area is somewhat less windy for those directions.

The west entrance to the new building is at station 12 and predicted winds there are never worse than Category 4. Note that pedestrians entering there will come down the alleyway from Longwood Avenue and by station 16 (see Figure 3) which is in Category 5 for all seasons. The new east entrance is at station 11, which again is always in Category 5. This entrance will probably be approached from Longwood Avenue most of the time. Station 20 at the corner of the Massachusetts College of Art Building at the intersection of Palace Road and Longwood Avenue is on the way to that entrance. That location is predicted to be in Category 3. It is apparently the windiest spot encountered using that way to the Palace Road entrance. However, the MCPASB probably has little or no effect on the windiness at station 20. The existing entrance that faces Longwood Avenue is at station 18, which is just in Category 3, except in the summer when it is in 4. This is another station where the addition of the MCPASB will have little or no effect on its windiness.

Finally, it is believed that, while the model and flow simulation are adequate for NW, N, NE, and E winds, not having all the tall buildings to the SE, S, SW, and W probably has affected the erosion wind speeds for those directions. However, the most likely effect would be to cause the pedestrian winds to be faster rather than slower. Thus the predicted wind speeds are likely to be slightly high for those directions.

8.0 SUMMARY OF RESULTS

The erosion technique has been used in a wind tunnel test at the WBF to obtain estimates of the occurrence of PLWs at 28 stations near the proposed Massachusetts College of Pharmacy and Allied Health Sciences Alternative B Building (MCPAB).

The results of the study can be summarized as follows:

1) No station considered in the test had annual or seasonai predicted winds that exceeded the Boston Redevelopment Authority (BRA) guideline wind speed, or fell within Melbourne's Category **1**, dangerous and unacceptable.

2) Only one station (8 at the north corner of the MCPASB) had annual predicted winds that fell into Melbourne's Category 2, uncomfortable for walking. Seasonally, station 8 had predicted PLWs that were in Category 2 for the winter, spring and fall seasons. Station 10 (next to 8 along the northwest wall of MCPASB) also had predicted PLWs the fell in Category 2 in the winter. No significant pedestrian traffic is expected near either stations 8 and 10, or 7 and 9. All other stations fall in categories 3, 4 , or 5 and thus have predicted winds that are acceptable for walking and other pedestrian activities

3) Predicted annual PLWs at the existing main entrance to the MCPSAB are in Category 3, comfortable for walking. Those at the new E and W entrances are predicted to be in categories 5 (comfortable for long periods of standing or sitting) and 4 (comfortable for short periods of standing or sitting), respectively. Further, the most likely used pedestrian approaches to both these E and W entrances will have winds comfortable for walking.

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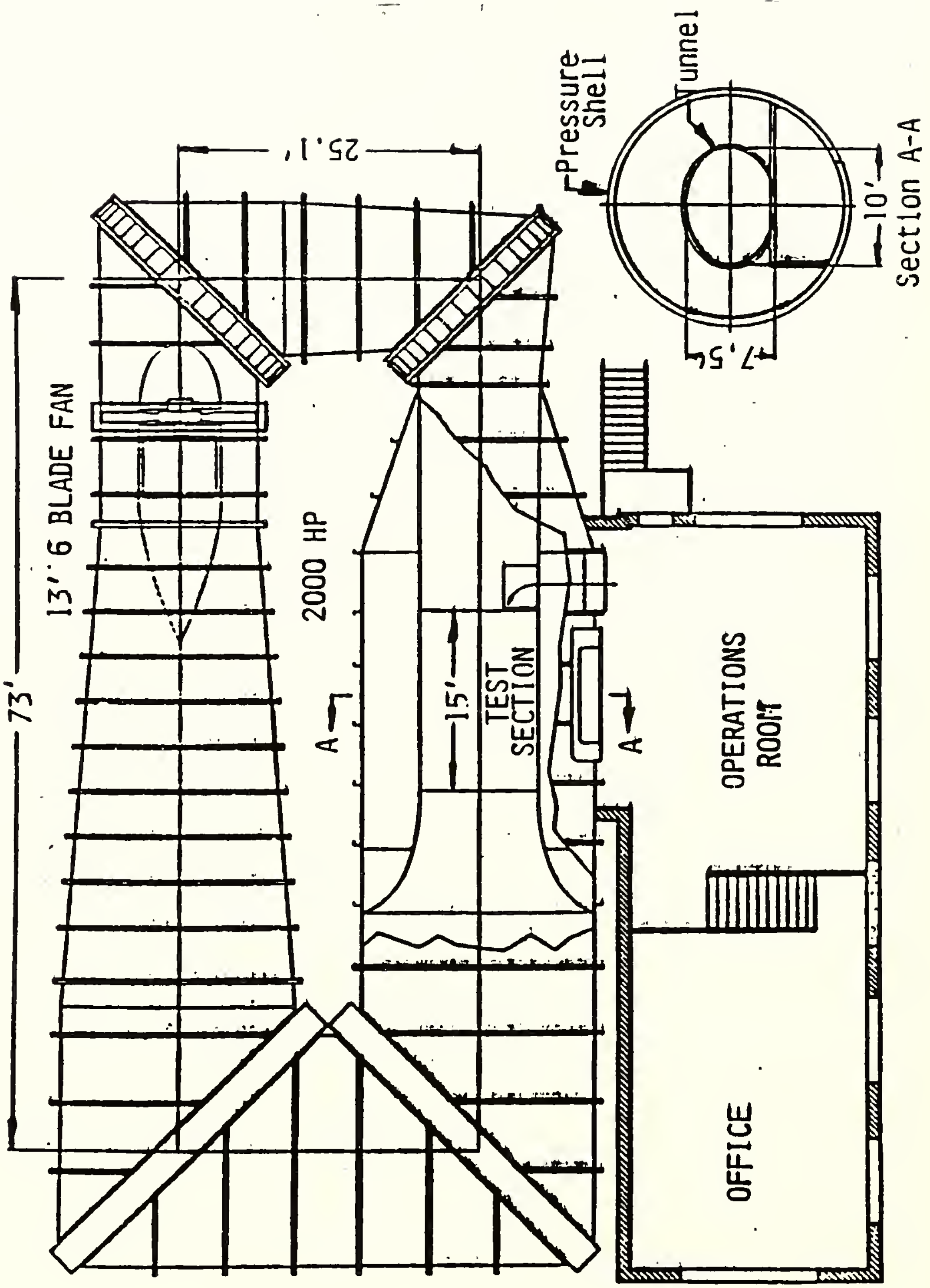


Figure 1. Schematic Diagram of Wright Brothers Wind Tunnel

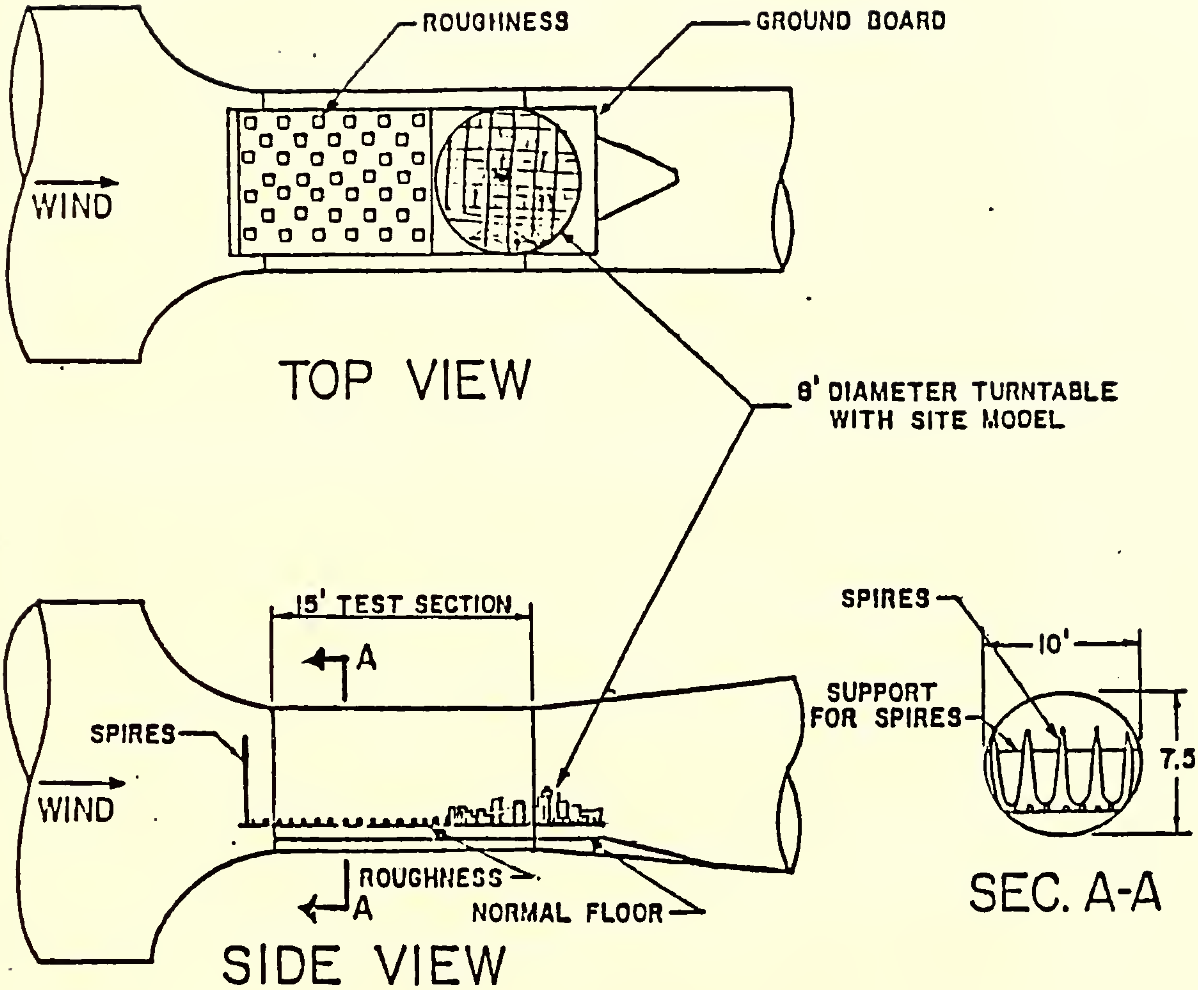


Figure 2. Schematic of the Typical Setup used to Simulate the Earth's Boundary Layer

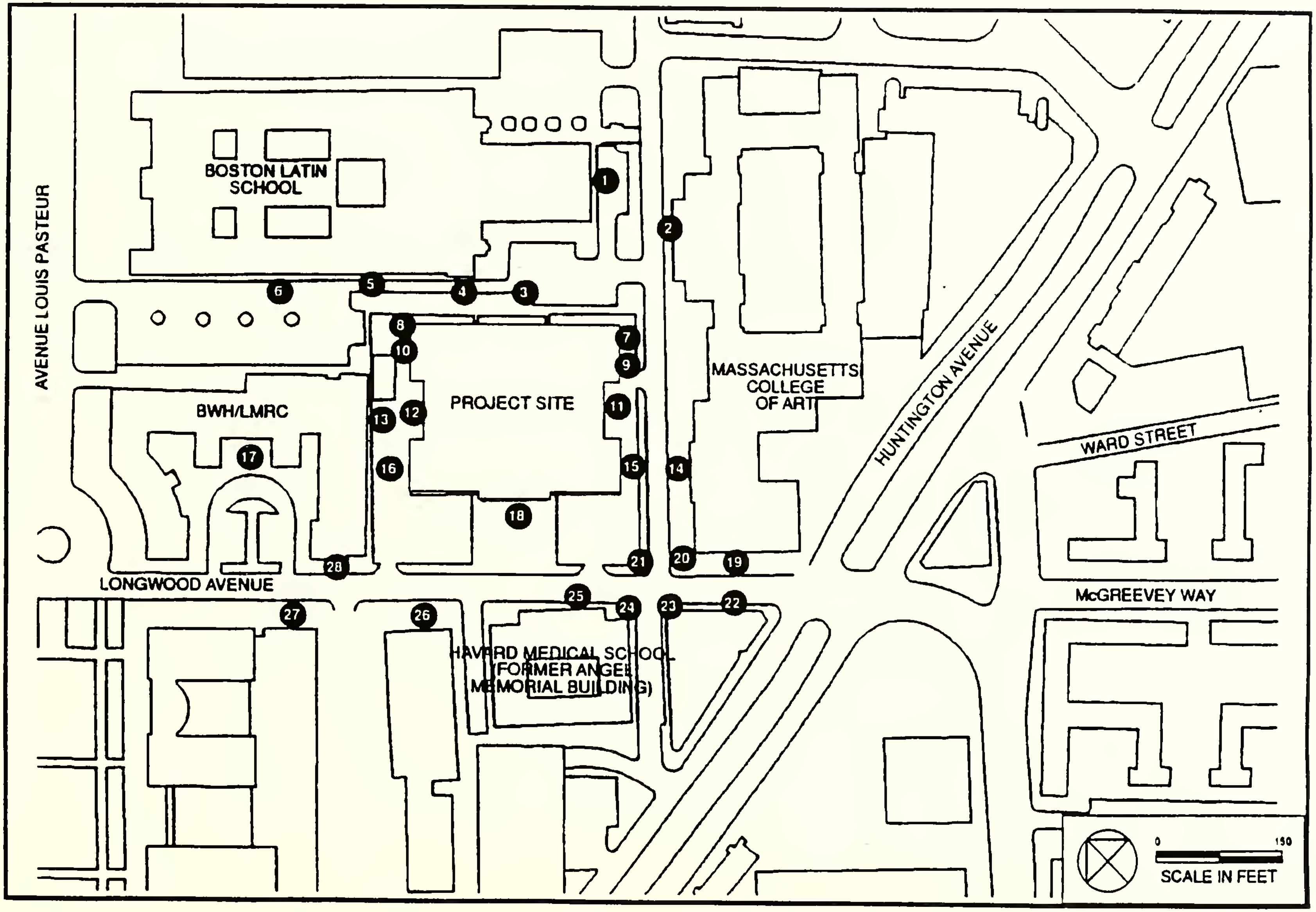


Figure 3. Map of Building and Site Showing Station Numbers

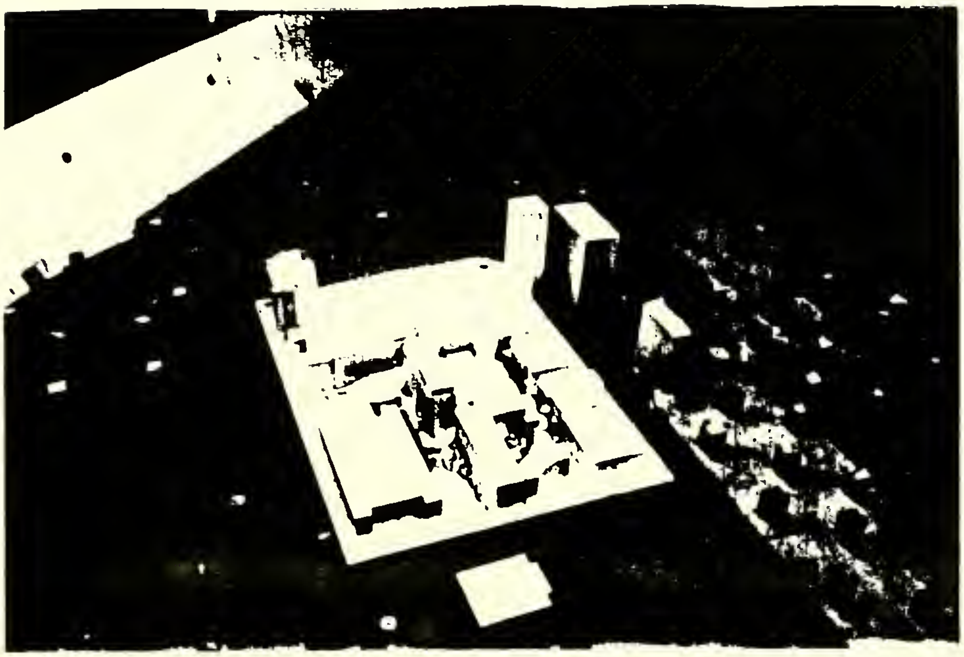


Figure 4. Two Photographs of Model in the Wind Tunnel

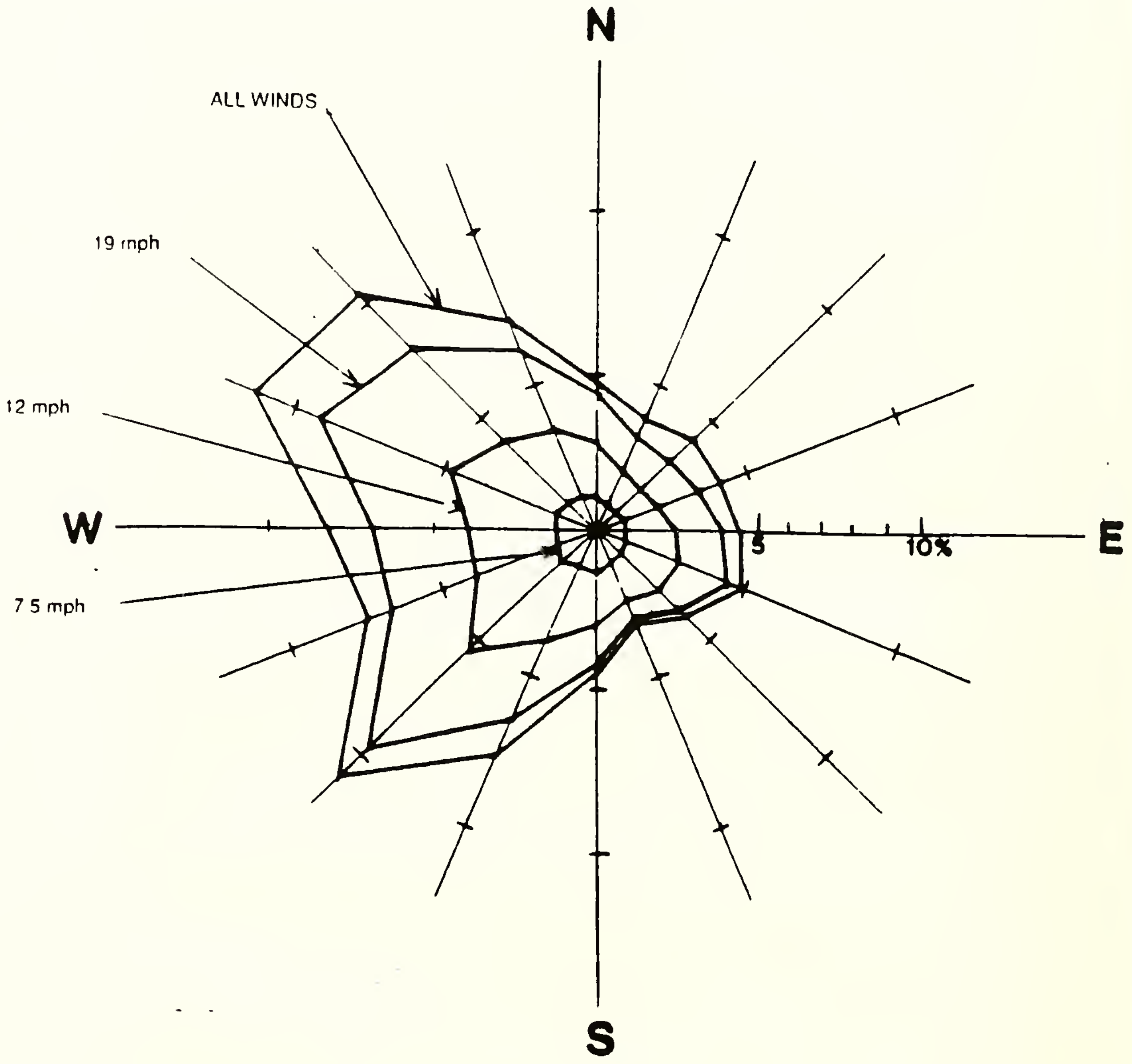


Figure 5. Annual Wind Rose for Boston - Based on Surface Data from Logan Airport: 1945 -1965

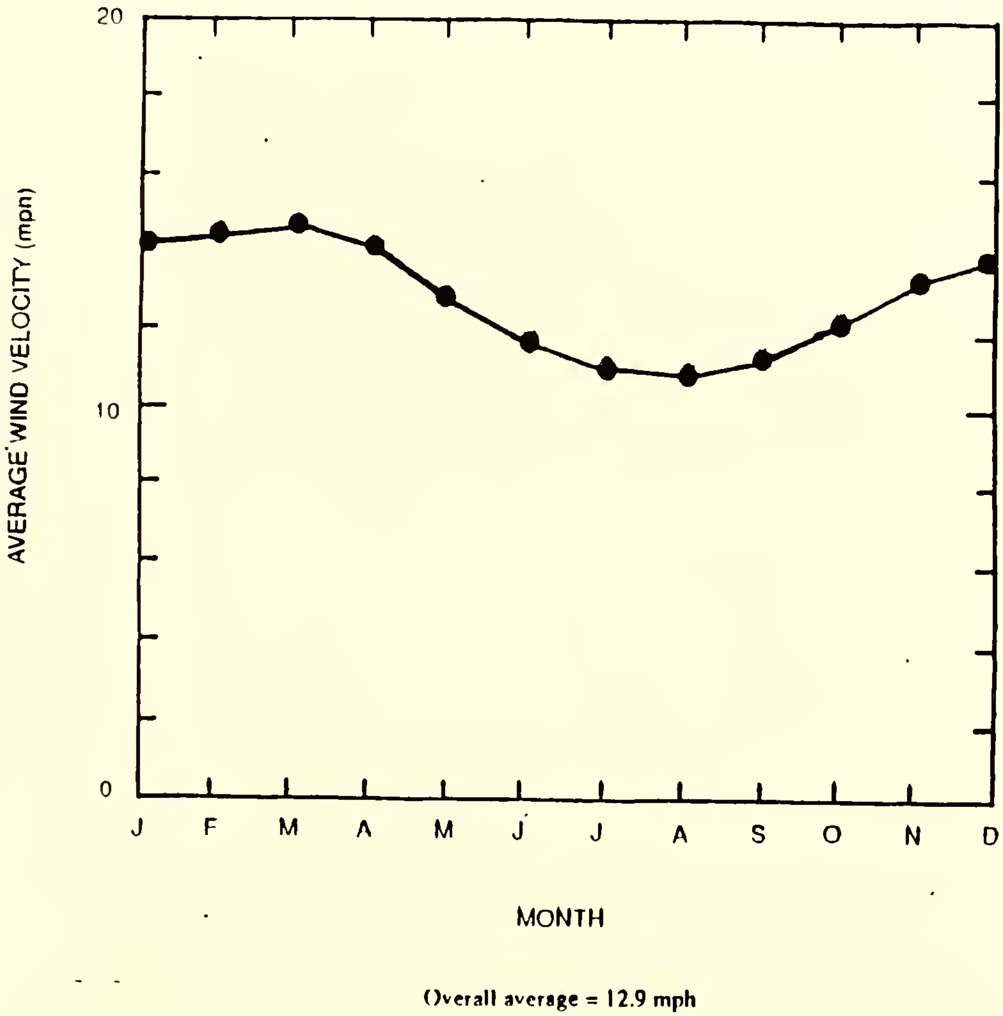


Figure 6. Average Wind Speed at 58 Feet at Logan Airport by the Month

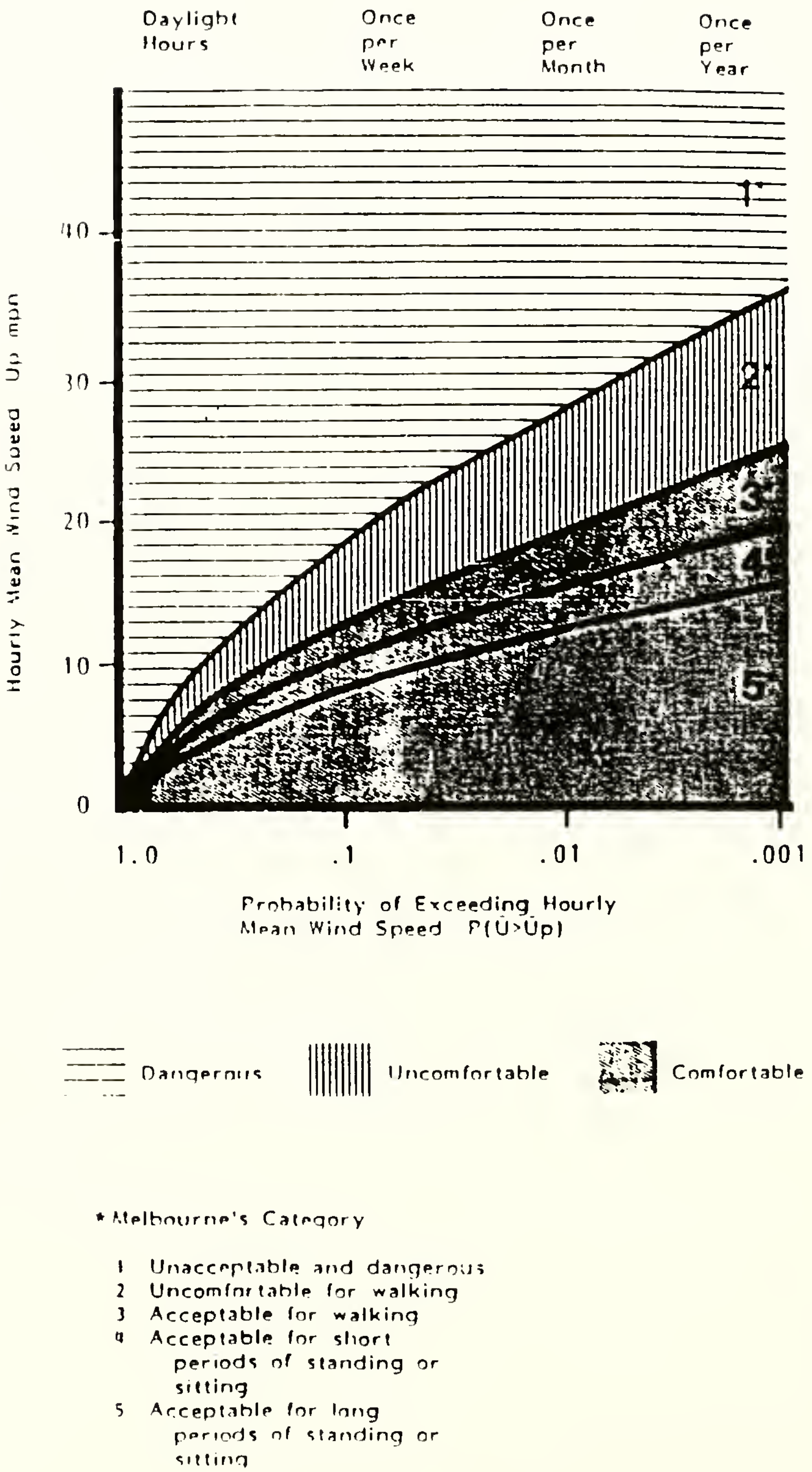


Figure 7. Melbourne's Criteria for Equivalent Average Hourly Pedestrian Level Winds

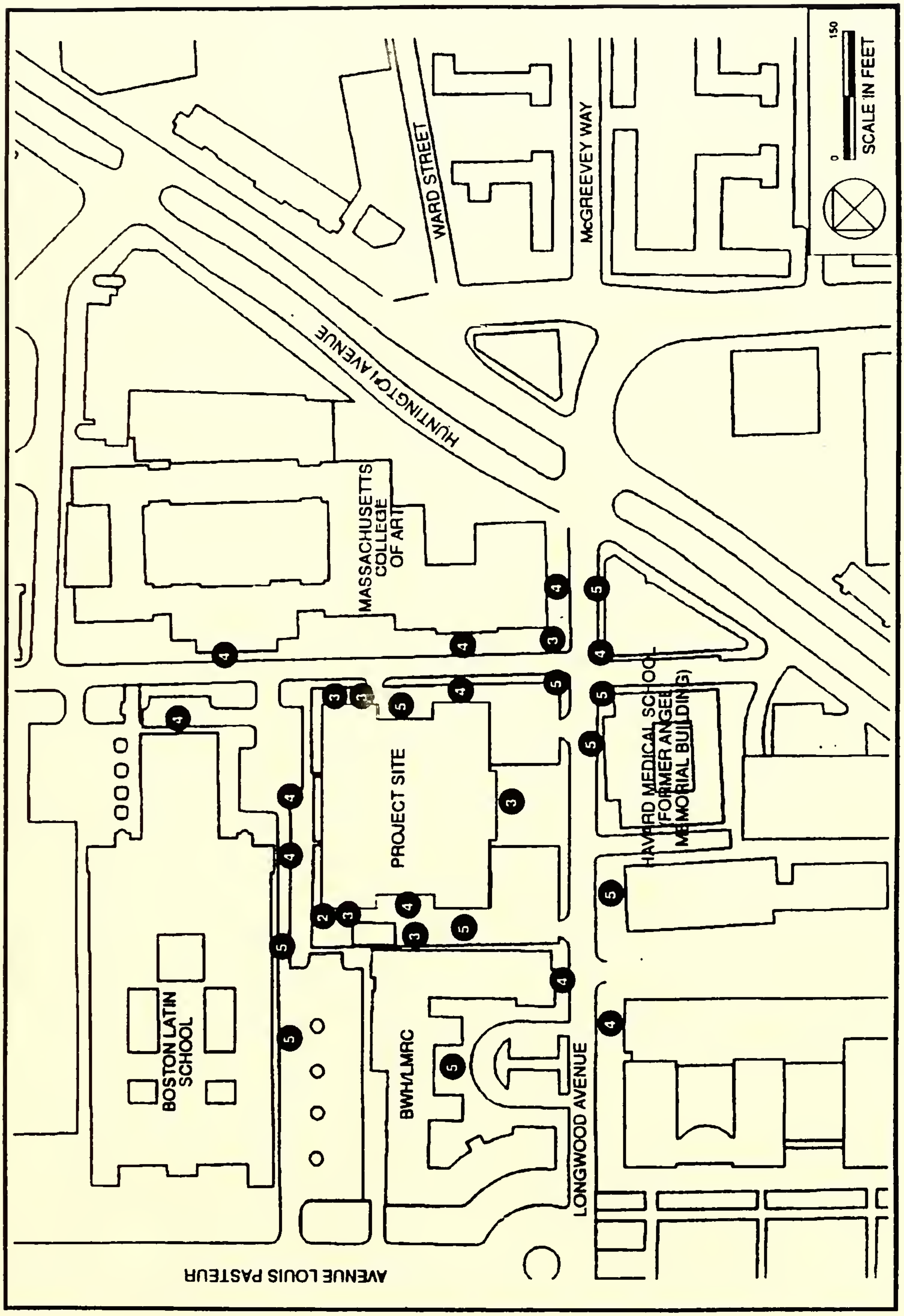


Figure 8. Map Showing Predicted Melbourne Categories for Each Station Annually

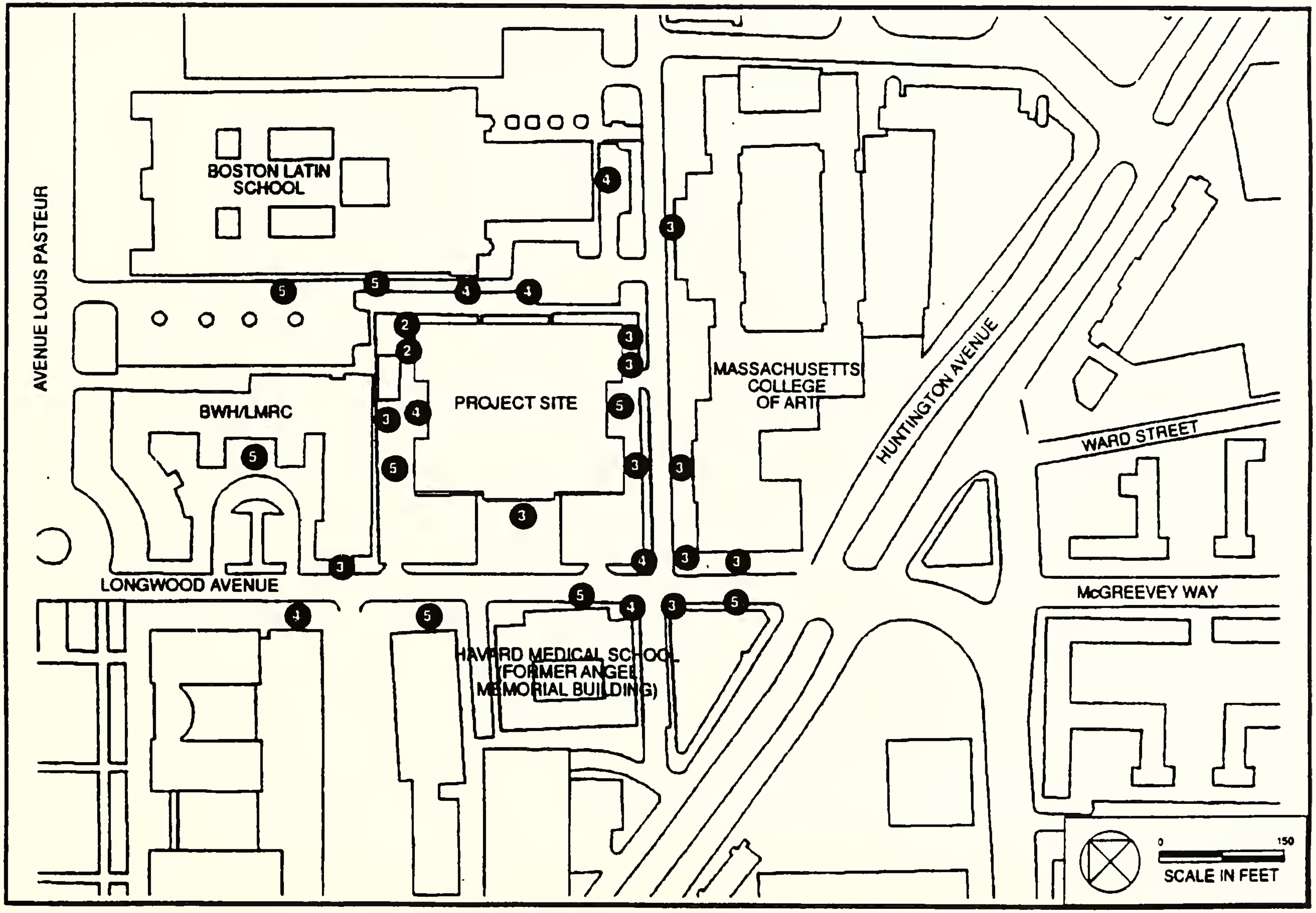


Figure 9. Map Showing Predicted Melbourne Categories for Each Station for Winter

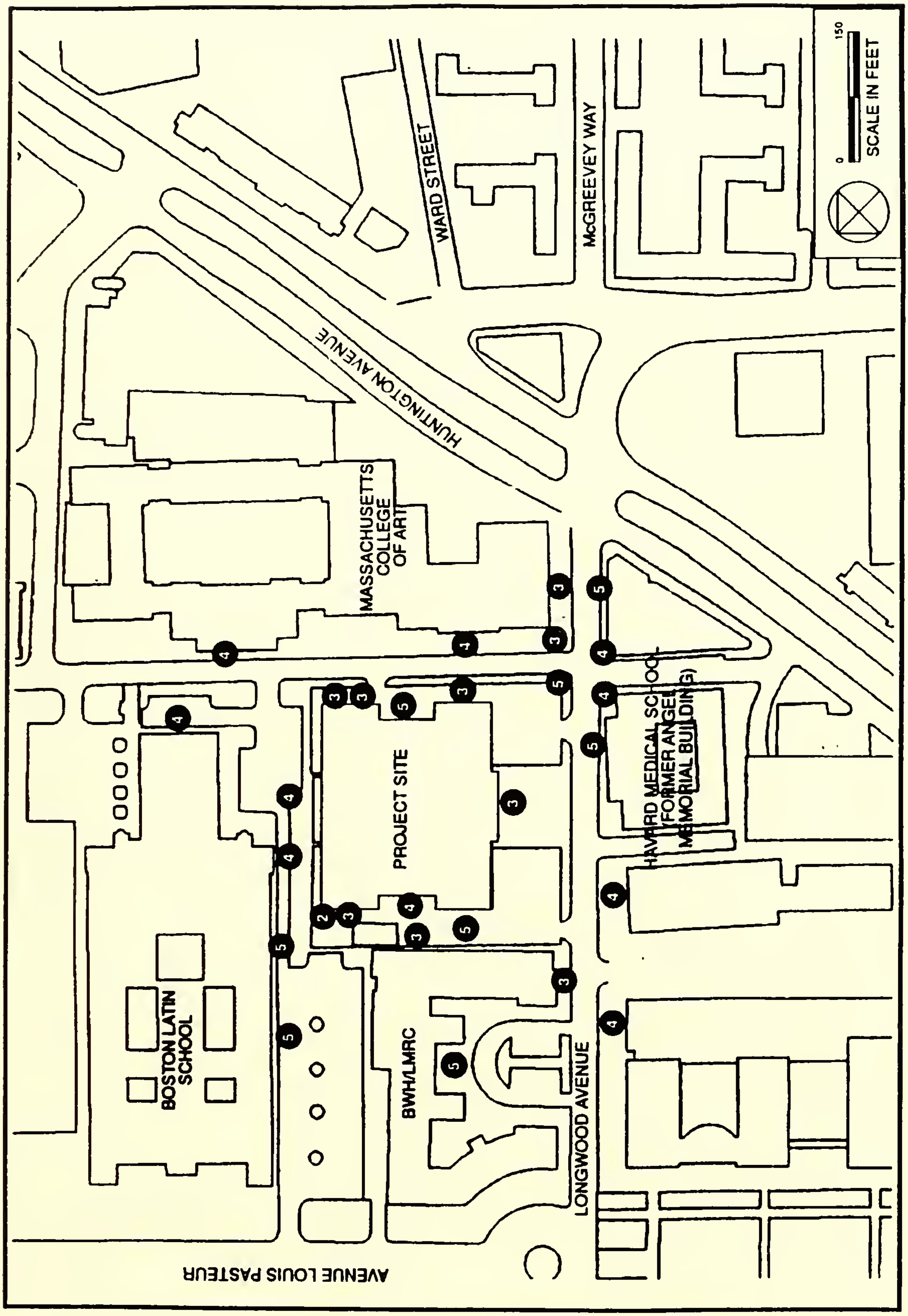


Figure 10. Map Showing Predicted Melbourne Categories for Each Station for Spring

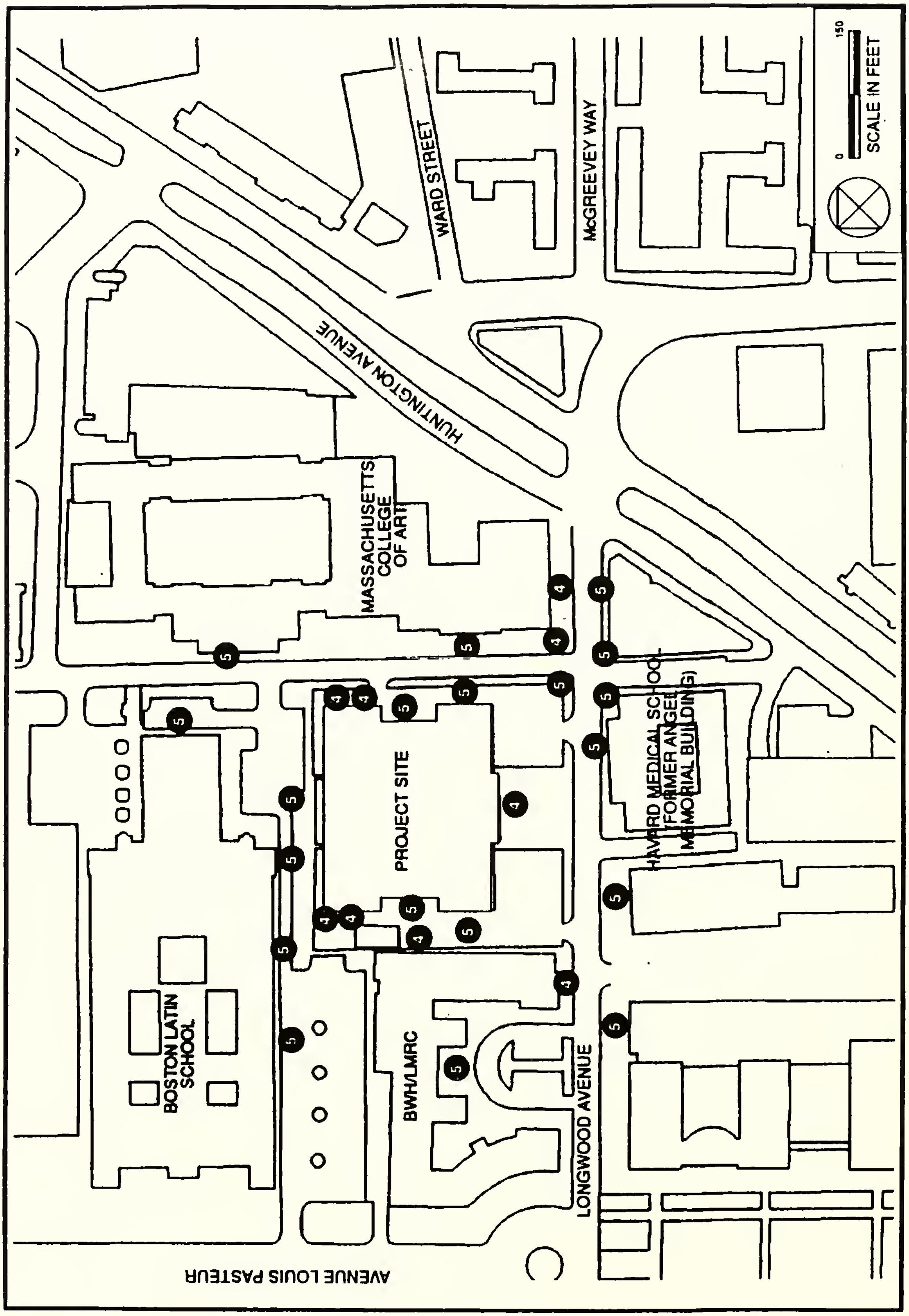


Figure 11. Map Showing Predicted Melbourne Categories for Each Station for Summer

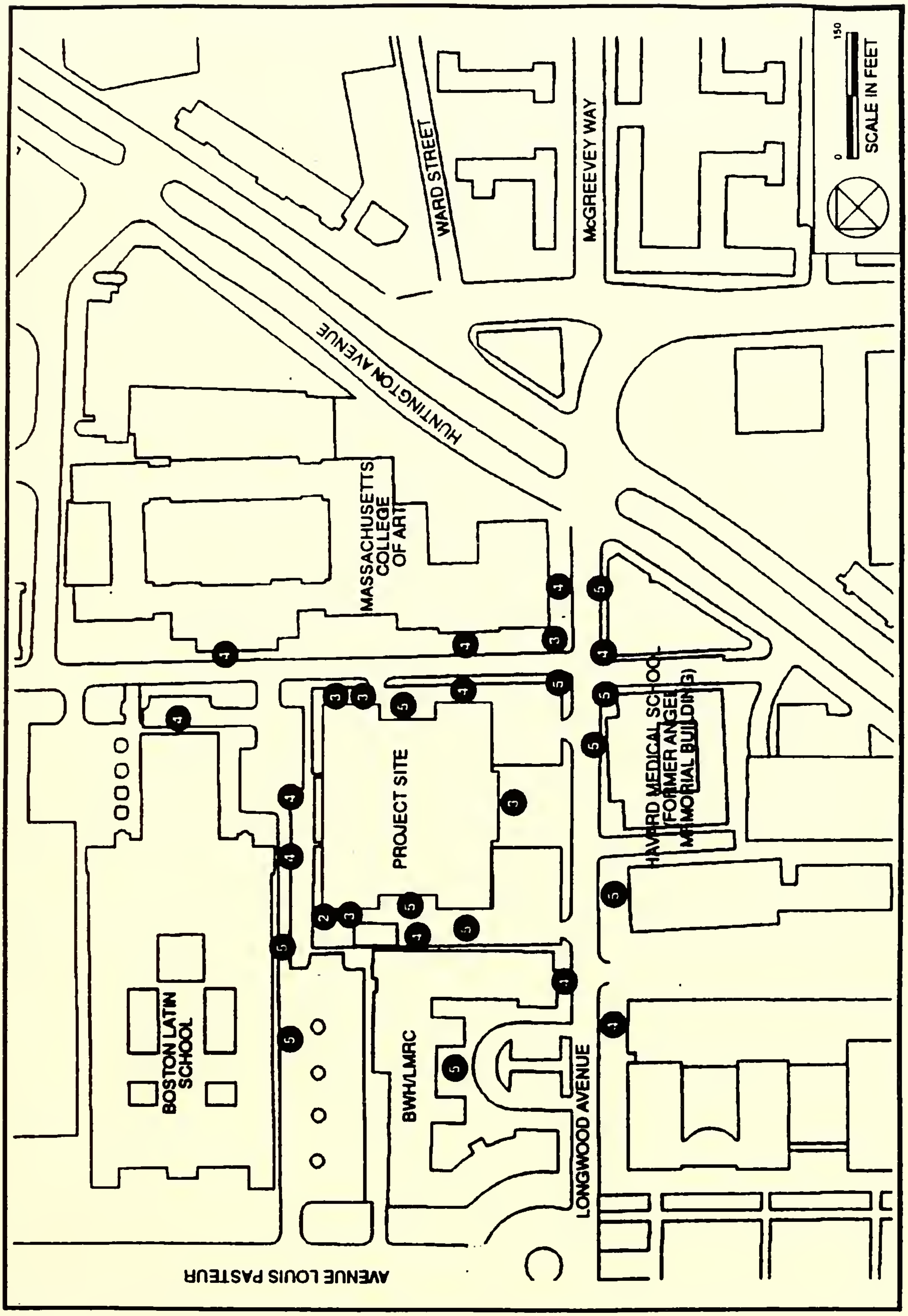


Figure 12. Map Showing Predicted Melbourne Categories for Each Station for Fall

TABLE III

MASSACHUSETTS COLLEGE OF PHARMACY
AND ALLIED HEALTH SCIENCES;

PREDICTED 100-HOUR RETURN PERIOD PEDESTRIAN LEVEL
WINDS AND MELBOURNE CATEGORIES FROM AN
EROSION STUDY OF THE ALTERNATIVE B BUILDING

STATION	EQUIVALENT AVERAGE WINDS					MELBOURNE CATEGORIES				
NO.	ANN	WIN	SPR	SUM	FAL	ANN	WIN	SPR	SUM	FAL
1	12	13	13	9	12	4	4	4	5	4
2	13	15	13	10	12	4	3	4	5	4
3	13	14	14	10	13	4	4	4	5	4
4	12	12	13	9	12	4	4	4	5	4
5	10	11	11	8	10	5	5	5	5	5
6	11	11	11	9	11	5	5	5	5	5
7	17	18	18	13	17	3	3	3	4	3
8	19	19	20	14	19	2	2	2	4	2
9	16	17	18	13	17	3	3	3	4	3
10	17	19	18	13	16	3	2	3	4	3
11	11	11	11	8	11	5	5	5	5	5
12	12	13	12	9	11	4	4	4	5	5
13	15	16	15	12	14	3	3	3	4	4
14	13	15	14	10	12	4	3	4	5	4
15	14	15	16	11	14	4	3	3	5	4
16	10	10	11	8	10	5	5	5	5	5
17	11	11	11	9	10	5	5	5	5	5
18	15	15	16	14	15	3	3	3	4	3
19	14	15	15	13	14	4	3	3	4	4
20	16	17	17	14	15	3	3	3	4	3
21	11	12	11	9	10	5	4	5	5	5
22	10	10	11	8	10	5	5	5	5	5
23	14	15	14	11	13	4	3	4	5	4
24	11	12	12	9	11	5	4	4	5	5
25	10	10	10	8	10	5	5	5	5	5
26	11	11	12	8	11	5	5	4	5	5
27	12	13	13	9	12	4	4	4	5	4
28	14	15	15	10	14	4	3	3	4	4

Beaufort Number	Description of Wind	Speed (m/sec)*	Speed (mph)*	Description of Wind Effects
0	Calm	Less than 0.4	Less than 0.9	No noticeable wind
1	Light airs	0.4 - 1.5	0.9 - 3.4	No noticeable wind
2	Light breeze	1.6 - 3.3	3.5 - 7.4	Wind felt on face
3	Gentle breeze	3.4 - 5.4	7.5 - 12.1	Wind extends light flag Hair is disturbed Clothing flaps
4	Moderate breeze	5.5 - 7.9	12.2 - 17.7	Wind raises dust, dry soil and loose paper Hair disarranged
5	Fresh breeze	8.0 - 10.7	17.8 - 23.9	Force of wind felt on body Drifting snow becomes airborne Limit of agreeable wind on land
6	Strong breeze	10.8 - 13.8	24.0 - 30.9	Umbrellas used with difficulty Hair blown straight Difficulty to walk steadily Wind noise on ears unpleasant Windborne snow above head height (blizzard)
7	Moderate gale	13.9 - 17.1	31.0 - 38.3	Inconvenience felt when walking
8	Fresh gale	17.2 - 20.7	38.4 - 46.3	Generally impedes progress Great difficulty with balance in gusts
9	Strong gale	20.8 - 24.4	46.4 - 54.6	People blown over by gusts

*Effective gusts

TABLE 4. Beaufort Wind Scale for Pedestrians (after Penwarden)

APPENDIX I

DESCRIPTION OF THE EXPERIMENTAL EQUIPMENT

A1.1 THE WIND TUNNEL

The Wright Brothers Memorial Wind Tunnel (WBWT) is a closed return wind tunnel with a 7.5 by 10.0 foot elliptical test section approximately 15 feet long (see Figure 1). The wind tunnel can be evacuated to about 1/4 of an atmosphere and pressurized to about two atmospheres. Wind speeds up to 170 mph at atmospheric pressure are currently available.

For non-aeronautical tests, such as represented by this study, a special floor is installed at a height of one foot above the 5 feet wide regular floor of the wind tunnel. The special floor extends 2 feet into the contraction section and 4 feet into the diffuser. This 'ground board' provides a flat plane on which to develop a simulated earth's boundary layer. An 8 foot diameter turntable is mounted flush with the ground board in order to rotate the model so as to simulate the wind coming from any direction. The center of the turntable is 15 feet from the leading edge of the ground board (see Figure 2).

A suburban type scaled earth's boundary layer was developed in the wind tunnel using 50 inch tall spires installed near the leading edge of the ground board. There was a 2x4 inch trip 6 inch down stream of the spires, followed by about 12 feet of roughness blocks 1.5 inch square and 2 inches high distributed between the spires and turntable. Also, some of the roughness blocks were placed on the turntable around the model. At the 1-384 scale, these roughness blocks were equivalent to five to six story buildings (seeFigures 2 and 3).

A1.2 THE MODEL AND ITS SURROUNDINGS

The model used for this test was built at a scale of 1-384 (1/32 inch equals one foot full scale). Normally the model would include all buildings out to about 2400 feet from the MCPASB. In this case, because it was known that the wind directions of primary interest were from the NE and NW, a smaller model was used. The model was about 2 by 3 feet and modeled all buildings between Avenue Louis Pasteur and Huntington Avenue and from one building S of Longwood Avenue N to Tetlow Street. Models of the Charlesbank Apartments, the Harvard School of Public Health, and the now unused Boston English High School building were included off the model but on the turntable. These added buildings insured reasonable simulation of the main upstream buildings to the NW, NE, and SW. finally, some of the roughness blocks were placed on the turntable around the model. At the 1-384 scale, these roughness blocks were equivalent to five to six story buildings (see Figures 2 and 3).

A1.3 OTHER TEST EQUIPMENT

Other test equipment used consisted of the following:

1) An MKS model 398hd-100 was used to measure the pressure difference between a pitot tube mounted in the wind tunnel stilling section and the average of two piezo pressure taps on the walls on the test section. The resulting pressure difference was used to estimate the gradient wind speed in the wind tunnel test section;

2) Two Olympus model OM-1 cameras, one with a 35 mm lens and the other with a 100 mm lens, were mounted looking through two holes in the ceiling of the wind tunnel about one foot apart directly over the center of the model, These cameras took pictures of the models and eroded particles, The pictures from camera I covered the entire

modeled area and much of the turntable for most directions. Camera II only covered the central part of the modeled area.;

3) Three 'Tota-Light' flood lights were mounted in the tunnel to provide the extra light needed for the film used. They were mounted in such a way as to minimize aerodynamic interference and any shadows; and

4) Blue colored plastic particles were used for the erosion medium. The particles were flattened cylinders approximately 0.060 inches in diameter and 0.08 inches long and thus, at a scale of 1-384, were the equivalent of about 2 feet in diameter and 3 feet long. They were spread unifomly over all areas of interest with some space between particles.

APPENDIX II

CALIBRATION OF THE SIMULATED EARTH'S BOUNDARY LAYER

A2.1 INTRODUCTION

Proper wind tunnel simulation of the earth's atmospheric boundary layer requires careful consideration of the significant scaling relationships. The variables that must be modeled properly in the wind tunnel to insure adequate simulation of full scale conditions are: (1) The variation of the average wind speed with height; (2) The variation of the longitudinal root mean square (rms) turbulence fluctuation about the average wind speed with height; and (3) the power spectrum of the longitudinal velocity component. Scaling on the basis of these parameters represents state-of the-art methods in wind tunnel testing of buildings and ground structures. Each of these parameters and the similarity relations for sampling times are discussed in detail below

A2.2 WIND SPEED GRADIENT SIMULATION

The gradient of the average wind speed, or variation of average wind speed with height, can be readily simulated [8, 26]. Davenport and Isyumov [8] note that, while other, more sophisticated, approximations exist to the vertical wind speed gradient of the earth's boundary layer, the overall accuracy is not significantly better than the simple approximation:

$$\frac{U}{U_g} = \left(\frac{h}{h_g}\right)^{\alpha} \qquad \text{Eq. A2.1}$$

Where:

U is the average wind speed at height h

U_g is the average wind speed at gradient height h_g

α is the power law constant - typically 0.14 to 0.45

Davenport [6,8] in early papers states that h_g and α vary with the type of terrain, as shown in Table A1. While many authors have tried to suggest improved tables, the differences are not large. These parameters and their appropriate terrain are depicted in Figure A1.

TABLE A1

GRADIENT HEIGHT AND EXPONENT AS A FUNCTION OF TERRAIN

TERRAIN	GRADIENT HEIGHT (h_g)	EXPONENT α
Urban	1700 ft	0.40
Suburban	1300 ft	0.28
Open country	900 ft	0.16

The boundary layer used for this test had an α of 0.34 and an h_g of 34 inches, which is equivalent to a full scale height of about 1100 feet.

In view of the site, its surroundings, the lack of a full model, and the heights of the tallest nearby buildings (they are much lower than the top of the boundary layer), these values of h_g and α are considered reasonable. The effect of the low gradient height was corrected for in the data reduction.

It must be remembered that the values for h_g and α presented in Table A1 are guidelines and are representative of the wind speed gradients that Davenport suggested from his surveys of full scale measurements. Thus his values cannot be expected to agree exactly with those from any particular site. For a review of the variations that have been found by other authors at other sites, see the article by Counihan [5].

Figure A2 depicts the variation of the measured average wind speed as a function of height for the boundary layer used in this test. All data from these tests were adjusted to the correct gradient height to compute the 100-hour return period wind speeds based on the fit to the data shown in the figure.

A2.3 LONGITUDINAL TURBULENCE INTENSITY

The longitudinal turbulence intensity is a measure of the root mean square (rms) wind speed variation about the average wind speed (that is, it is a measure of the total energy in the fluctuating part of the flow). Figure A3 is a plot of the ratio of longitudinal turbulence intensity to gradient wind speed versus height measured in the wind tunnel. Also, that data is compared with strong wind data from Brookhaven, NY, and Sale, Australia, as presented by Campbell and Standen [3].

Brookhaven is considered typical of suburban areas, so Campbell and Standen have assumed a gradient height h_g of 1300 feet and an exponent α of 0.28. Sale, Australia, represents open terrain and was assigned a gradient height of 900 feet and an exponent α of 0.16. These values appear to have been selected directly from Davenport's results, given in Section A2.2. In a later publication, Counihan [5] presents values of α = 0.21 to 0.33 for Brookhaven and α = 0.16 to 0.176 for Sale. These were compiled from various authors published since 1955. The scatter in the data is probably quite reasonable, since it is not likely that any of the data was taken in truly adiabatic conditions. Thus, a comparison of wind tunnel turbulence intensity to full scale atmosphere conditions must be interpreted for general, not exact agreement.

With the above in mind, the comparison between turbulence measured in the wind tunnel and that measured in Brookhaven confirms that the turbulence intensity measured in the wind tunnel is adequate.

A2.4 POWER SPECTRAL DENSITY

The power spectral density is a measure of the distribution of the kinetic energy in the wind speed fluctuations over the entire range of frequencies. The power spectra of the longitudinal wind speed component of the simulated flow described above was obtained with the aid of the WBF's PDP 11-23 computer. The output of the hot-wire used was passed through a low pass filter set at 128 hz before being sampled by the computer. The wind speed was sampled 256 times per second for four seconds. The sampled data was then passed through a Fast Fourier transform to calculate the values of the power spectrum. Data was taken at 12 inches above the floor, corresponding to about four hundred feet full scale.

The power spectrum shown in Figure A4 is the average of 32 spectra. The shape of the spectrum shown is in reasonable agreement with the empirical strong wind spectrum proposed by Davenport and Isyumov [8] and the more theoretical one

dimensional spectrum of Von Karman [26, 30, 47]. This shows that the integral scale of the turbulence in the boundary layer is appropriate for the 1 - 384 scale model used.

Davenport's spectrum is defined by:

$$\frac{nS(n)}{\sigma^2} = \frac{2}{3}\frac{X_d^2}{(1+X_d^2)^{4/3}} \qquad \text{Eq. A2.2}$$

Von Karman's one dimensional spectrum is defined by:

$$\frac{nS(n)}{\sigma^2} = \frac{2}{\pi}\frac{X_v}{(1+X_v^2)^{5/6}} \qquad \text{Eq. A2.3}$$

Where:

$X_d = nL/U_{33}$
$X_v = 2\pi n l_x/U_g$
$S(n)$ = Power spectral density function
N, n = Frequency - full scale, model
U_{33} = Average wind speed at 33 feet full scale
L = Davenport's length scale: 3000 - 4000 feet full scale
l_x = Von Karman's integral scale: 500 - 700 feet full scale
σ = rms of fluctuating wind speed

According to Davenport [6], the power spectral density function is independent of height for much of the boundary layer height. Wind speed is a function of height, h. To convert N/U_{33} full scale to n/U_1 in the wind tunnel (U_1 is the average wind speed at one foot off the floor in the wind tunnel), the following relationship is used:

$$n/U_1 = m(33/m)^{\alpha}(N/U_{33}) \qquad \text{Eq. A2.4}$$

Where:

m = the reciprocal of the scale factor
α = the wind speed gradient power law exponent

In this test m = 384 and α = 0.30

Note that proper matching of the power spectrum assures that the sizes of the gusts in the wind tunnel are appropriately scaled and distributed over the range of gust sizes.

A2.5 'SIMILARITY RELATION' FOR SAMPLING TIMES

A2.5.1 Introduction

In order to use the wind tunnel results with the results from the wind climate analysis, it is necessary to establish, for the particular model scale, the time span in the wind tunnel that constitutes the equivalent of one hour full scale. A full scale time

span of one hour is chosen because of its location in the meteorological gap, as reported by Van der Hoven [48].

For determining an average or rms wind speed, the one hour is not critical. The requirement is that the average and rms are sampled over a sufficient amount of time, that increasing the sampling time will not significantly change either quantity. When measuring peak winds, an increased sampling time results in increased peaks, due to the random nature of the peaks. The increases in the measured peaks display diminishing values as the time increases without bound. Thus it is important, when peaks are measured, that the time relationship between model and full scale be appropriately established.

The 'similarity parameter' (non dimensional time period) used for establishing the proper time relationship is:

$$UT/D = ut/d$$

Where:

T,t = Period of sampling time;
U,u = Average wind speed during sample;
D,d = Characteristic dimension of model or building;

and the capital and lower case are for full and model scale respectively.

This 'similarity parameter' should be held constant between the wind tunnel model and the full scale situation.

A2.5.2 Ground Wind Sampling Times

In this erosion study, the gradient wind speed was varied from 10 to 40 mph, with an average increment factor of 1.32. The lowest speeds reveal the windiest areas and require the longest sampling time per full scale time period. The time required to change the wind speed and to take the two pictures was about 15 - 20 seconds. The 100-hour return period gradient hourly average wind speed in the Boston area is about 44 mph. The ratio between these two speeds, while not correct for any given pedestrian wind speed, will be nearly correct on the average. Estimating the required sampling time from the non dimensional time period defined above, one finds:

$D/d = 384$; $u = 13 - 23$ mph; $U = 44$ mph; $T = 3600$ sec;
Which leads to $t = 11 - 20$ sec.

Murakami et al. [39] and Hunt et al. [31] have shown that only gusts lasting longer than 2 or 3 seconds seriously affect people. Thus, it is important to measure only those gusts lasting longer than the equivalent of 2 to 3 seconds full scale. The particles are flattened cylinders the equivalent of about 2 feet in diameter and 3 feet long full scale. These particles are similar in size to people and thus are believed to filter out the gusts with durations too short to affect pedestrians. In studies in which hot-wires are used to measure PLWs at WBF, a 0.005 second resistance-capacitive filter is used to filter out gusts with durations less than 0.005 seconds. The agreement between the results from erosion and hot-wire studies reported in [13, 16] may in part be due to this natural filtering process in the erosion type tests.

APPENDIX III

REDUCTION OF THE EROSION DATA

A3.1 THE WIND CLIMATE

Surface wind data was obtained from Logan Airport for the years 1945 to 1965 from the National Climatic Center in Asheville, North Carolina. The data consists of 24 1-minute observations per day taken at hourly intervals and includes over 176,000 observations. The data was sorted by the 16 major compass directions (NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW, and N) and fitted as a whole, as well as by direction with Weibull probability distributions [15, 29, 36, 47]. The Weibull probability function has the form:

$$P(U > U_p) = A_\theta e^{-(U_p/U_\theta)^{K_\theta}} \qquad \text{Eq. A3.1}$$

Where:

$P(U > U_p)$ = probability of U exceeding U_p ;

A_θ = total probability of wind coming from direction θ ; Direction θ includes all directions between halfway back to the previous one to halfway to the next θ ;

U_θ = scaling wind speed determined from the fit of the Weibull approximation to the wind climate data;

K_θ = exponent determined from the fit of the Weibull Approximation to the wind climate data.

The values of A_θ, U_θ, and K_θ were obtained for each of the 16 major compass directions for an annual time period, winter (December, January, and February), spring (March, April, and May), summer (June, July, and August), and fall (September, October, and November). The values obtained are given in Tables A5, A6, A7, A8, and A9. The 17th value in each table is for winds from all directions. The values of U_θ in the tables have been adjusted so that the Weibull fit applies to the winds at gradient height and the Weibulll fit can be applied to the wind tunnel data.

In carrying out the above correction to U_θ, it was assumed that the data as taken at Logan Airport was equivalent to one hour averages. U_θ was then corrected to gradient height by using an average height for the data of 58 feet and assuming a power law boundary layer at the airport with a gradient height h_g of 900 feet and an α of 0.16.

In making the Weibull fits to the actual data from Logan Airport, it was not possible to obtain a good fit over the entire range of wind speeds. Since the Weibull fit obtained was to be used to calculate wind speeds that occurred 1% of the time, the best fit was obtained from 0.1% to 2% for each season and direction. Further, it was found that if one also obtained the annual Weibull constants in this way from annual data, the sum of the probabilities from the four seasons calculated from the Weibull coefficients did not add up to the annual probabilities for each direction. Thus, the seasonal and annual probabilities calculated from the Weibull coefficients were not consistent.

To overcome that difficulty, the probabilities from each season were calculated from the derived Weibull coefficients for each season and added up to obtain annual probabilities. These probabilities were then used to obtain a new set of annual probabilities for each direction. Finally, the probabilities calculated from the fit to the sum of the seasonal probabilities were compared with the original data. The resulting comparison showed that the fit derived from the seasonal probabilities for each direction was nearly as good as that derived directly from the annual data. Thus the coefficients for annual winds derived from the sum of the calculated seasonal probabilities have been used in this report and are given in Tables A8 to A12.

A3.2 THE 100-HOUR RETURN PERIOD WIND SPEEDS

The gradient wind speeds at which the particles were first observed to erode away from each station are given in Table A1. If one assumes that the equivalent average wind speed at pedestrian level that causes the particles to move is 10 mph, then the ratio of equivalent average wind speed to gradient wind speed, $V_{eq}/V_g = 10.0/V_{ero}$; where V_{ero} is the wind speed presented in the table and V_{eq} is the equivalent average hourly wind speed. The ratio V_{eq}/V_g is used with the Weibull Coefficients to calculate the equivalent average hourly wind speed that will be exceeded once in 100 hours at each station.

An iterative procedure is used. First one assumes a value for the pedestrian level equivalent average wind speed. For each of the 16 wind directions one then divides that wind speed by V_{eq}/V_g to obtain V_g. Setting $U_p = V_g$ in the appropriate Weibull equation for that direction, the probability of the assumed equivalent average wind speed can be obtained for each wind direction. The sum of these 16 probabilities if the total probability of the assumed wind speed occurring.

The assumed wind speed is then iterated until the total probability is 1%. The results of those calculations for this study are given in Table 3.

APPENDIX IV

CRITERIA FOR PEDESTRIAN LEVEL WINDS

Many authors have attempted to define criteria for pedestrian level winds. The task is made especially difficult because of its complexity and the subjectivity of the results. To be meaningful the result must be expressed in probabilistic form.

One of the first attempts to define a criteria for winds was made by Admiral Beaufort in 1806. His was an absolute criteria designed to allow a sailor to tell the difference between light breezes, gales, etc. It is still in use today. Penwarden [41] has reinterpreted the Beaufort scale for pedestrian level winds (Table 4). However, one must be careful when using Table 4, since the original Beaufort scale was apparently based on average winds, while the values given by Penwarden are for some sort of average gust similar to the effective gust (fastest 1-minute gust during an hour).

A significant point about the Beaufort scale is that at or above Beaufort 9 (47-55 mph) a number of authors [19, 36, 39] have noted that people have great difficulty in walking and a number of people have been hurt. Thus, it is now generally agreed [1, 4, 9, 11, 19, 31, 32, 34-39, 41, and 42] that winds of speeds greater that Beaufort 9 are dangerous and unacceptable.

Another aspect of the problem is concerned with the definition of what kinds of winds are most annoying, or otherwise affect pedestrians. The two most significant works in this area are by Hunt et al. [31] and Murakami et al. [39]. Both conclude that gusts are very important, but that those lasting less than 2 or 3 seconds do not seriously affect people. The particles used in this study were the equivalent of about 2 feet in diameter and 3 feet long full scale. Because of their size, they are believed to filter out gusts shorter than the equivalent of 2-3 seconds full scale.

Beaufort's criteria are absolute. Clearly, in a major storm it would not be surprising to encounter Beaufort 9 anywhere. On the other hand, it is reasonable not to expect Beaufort 9 winds very often. A probabilistic approach is needed to define how often Beaufort 9 or any other wind speed is acceptable.

In 1978, Melbourne [34] reviewed the literature to find a comprehensive probabilistic criteria for hour average PLWs that would be applicable for different types of pedestrian activities, as well as cover the safety aspects. He found and included data from Canada [7], England [31, 32, and 41], and Australia [36]. When assembled on a single probabilistic chart, all the criteria proved to be similar. The results of his study are summarized in Figure A9. The results of Radovsky and Durgin [44] and Cohen et al. [4] from the United States have been added to the others. The vertical scale is the hourly average wind speed in mph and the horizontal scale is the probability based on hours of that wind speed occurring.

Five criteria are noted. They are labeled 'unacceptable and dangerous', 'uncomfortable for walking', 'acceptable for walking', 'acceptable for short periods of sitting or standing', and 'acceptable for long periods of sitting or standing'. The estimates of occurrence in weeks months and years are due to Davenport [7]. Melbourne's criteria for hourly average PLWs have been in use at WBF since 1980.

Originally, Melbourne set up his criteria based on the peak two second gust occurring once in 1000 hours, or 3-4 times during one storm occurring during daylight hours each year. He chose to use Beaufort 9 (23 m/s or 51 mph) for the dangerous unacceptable gust at $P(U > U_p) = 0.001$ because as noted above, it is generally accepted that a gust of that strength is likely to knock a person down. To obtain the fit

to the average data from the other investigators shown in Figure A9, he divided his peak wind speeds by 1.5.

Pedestrian level winds tend to be unsteady. Thus when measuring PLWs using the quantitative hot-wire technique, the average, the root mean square variation about the average (rms), and the peak are determined. A problem is to decide which of these three quantities or what combination of them causes a location to be perceived as too windy. To overcome this difficulty, a number of authors have used an 'effective gust' wind speed which is defined as the average wind speed plus a constant (g) times the rms. Values of g from 1.0 to 3.5 have been proposed, 1.5 being the most common, except in Japan where 3.5 has been used. The guideline effective gust wind speed of 31 mph that has been used by the BRA is apparently based on using a value of 1.5 for g [9, 11, 20, 37, 38, and 43].

The basis for the use of the constant g is that, if the distribution of gusts over an hour were Gaussian, the effective gust would then have a fixed probability of occurring in that hour. Unfortunately, the assumption that the distribution of gusts is Gaussian, while true on the average for all locations and directions, it is not true for individual locations except very infrequently.

To obtain the probabilistic descriptions of PLWs at any one station needed for comparison with Melbourne's Criteria, the appropriate wind speed ratios must be used with a statistical description of the local wind climate in the manner described in Appendix III.

Melbourne and others have noted that approximately, on average, the peak 2 second gust is about two times the average wind speed. Further, if one uses g=1.5, the effective gust is about 1.5 times the average. Durgin [14] has examined these ratios for about 1000 stations from numerous studies performed at WBF. He found that when gusts shorter than 2-3 seconds were filtered out the ratios were 1.9 and 1.4 respectively.

In this report all comparisons are made using the 'equivalent average'. The 'equivalent average' is the largest of the average divided by 1.1, the effective gust divided by 1.43, or the peak gust divided by 1.88. As noted in Section 4 of this report, these ratios make the equivalent average conform with both the ratios found for the 1000 stations and the qualitative perceptive studies reported in references 31 and 39.

When Melbourne's Criteria are applied to the 100-hour return period equivalent average winds as defined above, they can be restated in tabular form as follows:

TABLE A2

MELBOURNE'S CRITERIA FOR 100-HOUR RETURN PERIOD EQUIVALENT AVERAGE WIND SPEEDS

CATEGORY	DESCRIPTION	WIND SPEED (mph)
1	UNACCEPTABLE-DANGEROUS	$27 \le U_{eqav}$
2	UNCOMFORTABLE FOR WALKING	$19 \le U_{eqav} < 27$
3	ACCEPTABLE FOR WALKING	$15 \le U_{eqav} < 19$
4	STATIONARY SHORT EXPOSURE	$12 \le U_{eqav} < 15$
5	STATIONARY LONG EXPOSURE	$U_{eqav} < 12$

The dotted line in Figure A9 shows the estimated conditions at 4.5 feet at Logan Airport in Boston. The 100-hour return period effective gust guideline wind speed of 31 mph has been converted to apply as an equivalent average wind speed. The result is shown in Figure A9 as a circumscribed star. In this report the calculated results are treated as 100-hour return period equivalent averages as defined above and in Section 4. However, each value listed really defines a complete curve such as those depicted in Figures 7 and A9 which passes through the given value.

Finally, because the equivalent average is defined as the highest of the three converted wind speeds (average, effective gust and peak gust), many times it will give higher estimates than the use of any one of the three speeds and thus it should be slightly more conservative (and more realistic) than the use of just the effective gust or average wind.

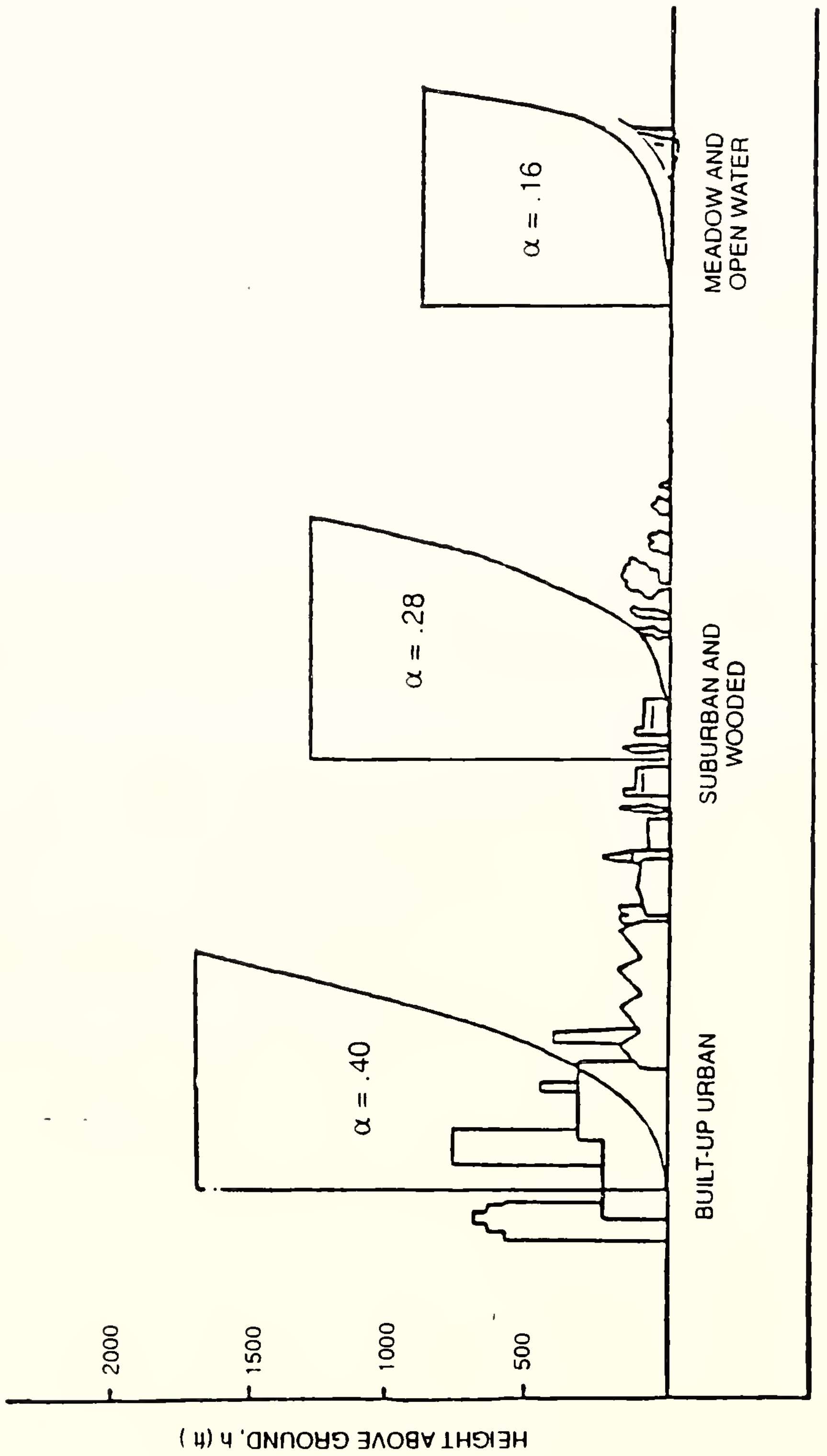


Figure A1. Types of Earth's Boundary Layers After Davenport

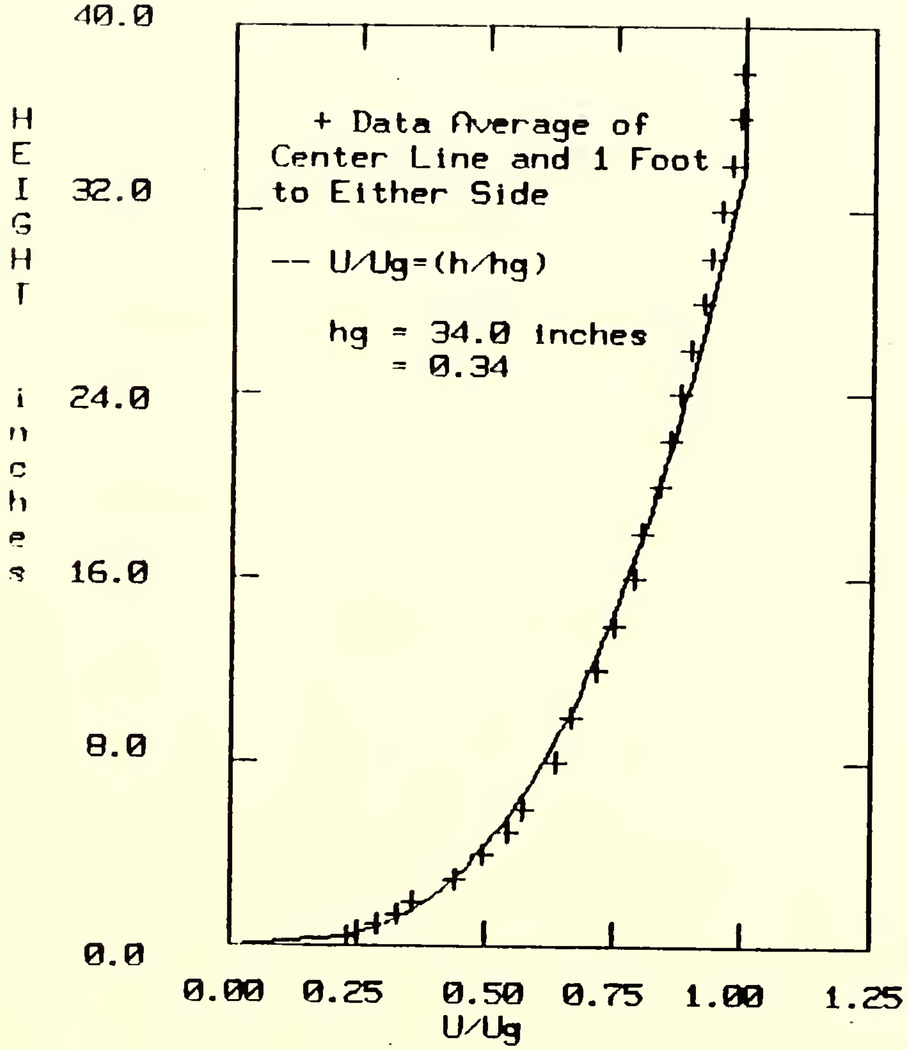


Figure A2. Measured Variation of Average Wind Speed Versus Height for Simulated Earth's Boundary Layer

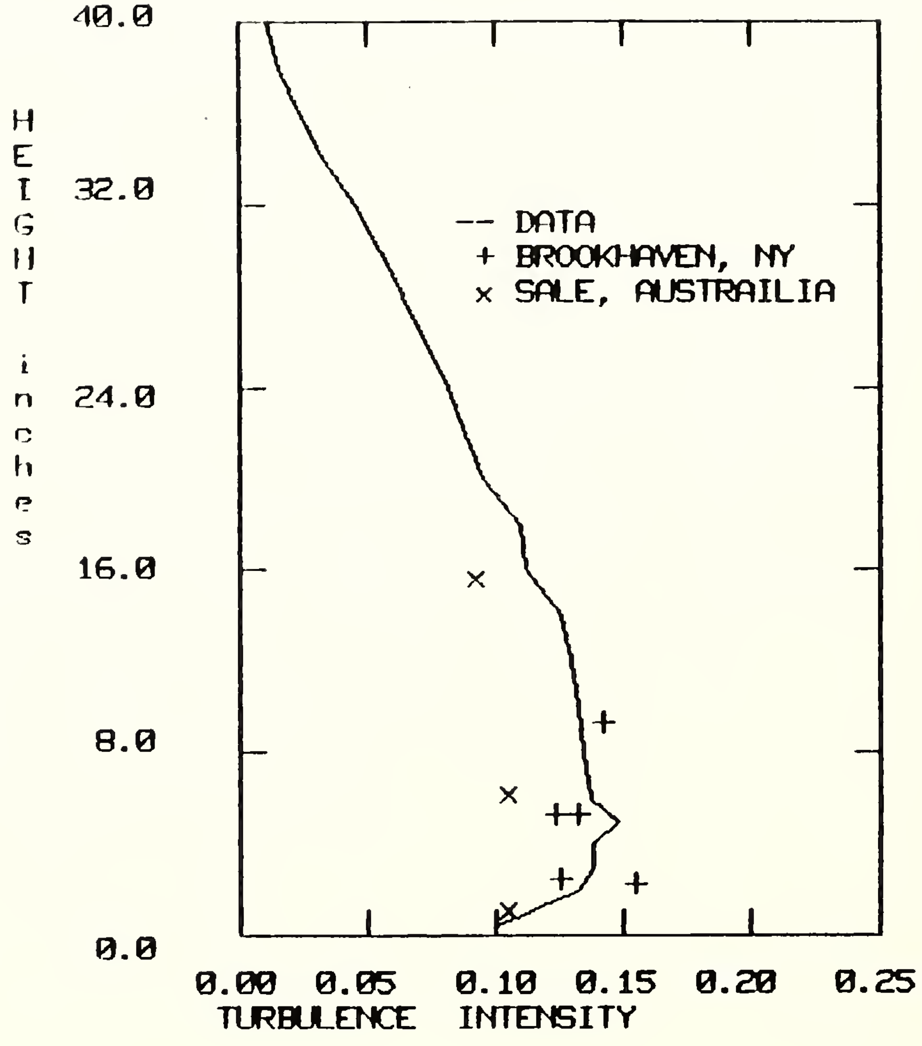


Figure A3. Measured Turbulence Intensity Versus Height for Simulated Earth's Boundary Layer

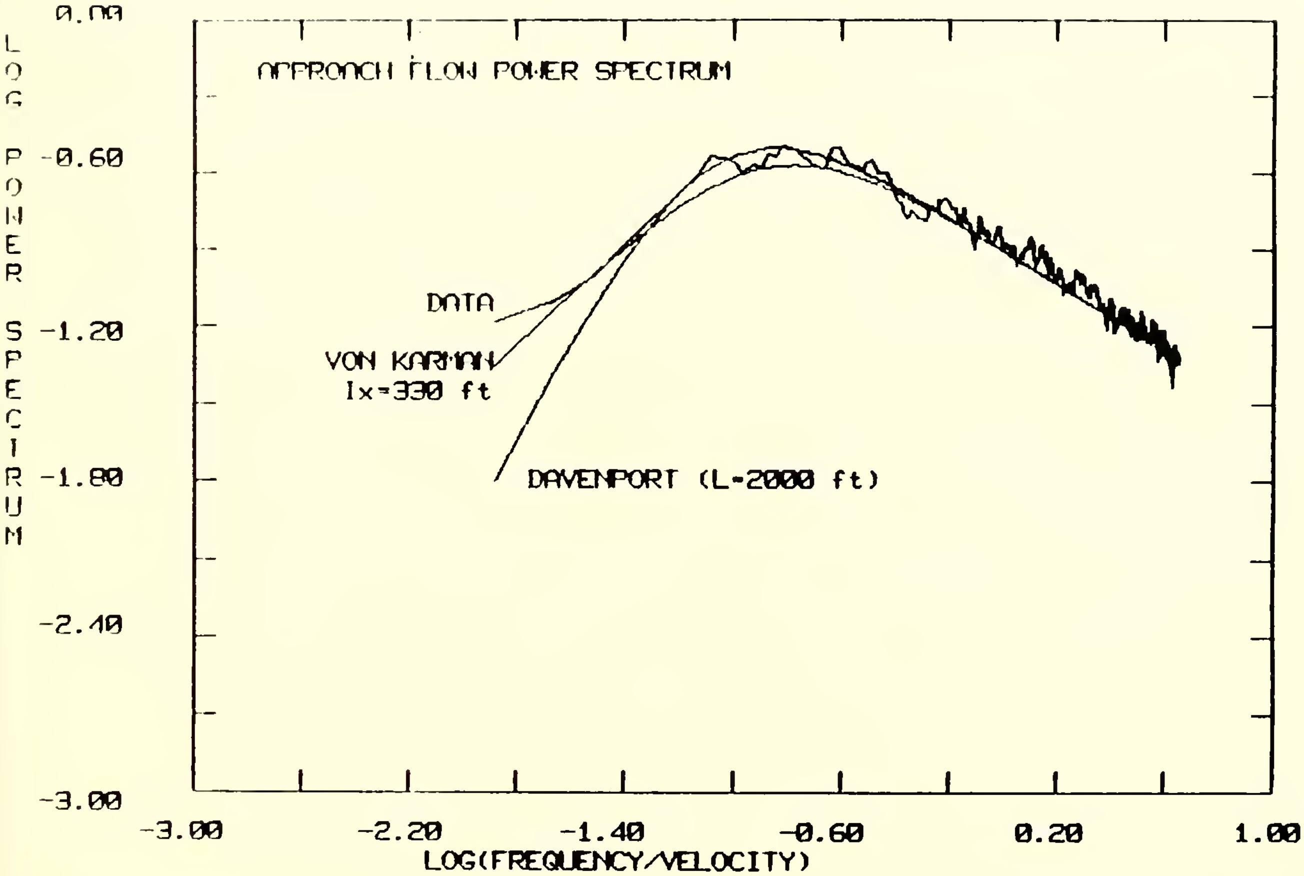


Figure A4. Measured Power Spectrum of Longitudinal Turbulence for Simulated Earth's Boundary Layer

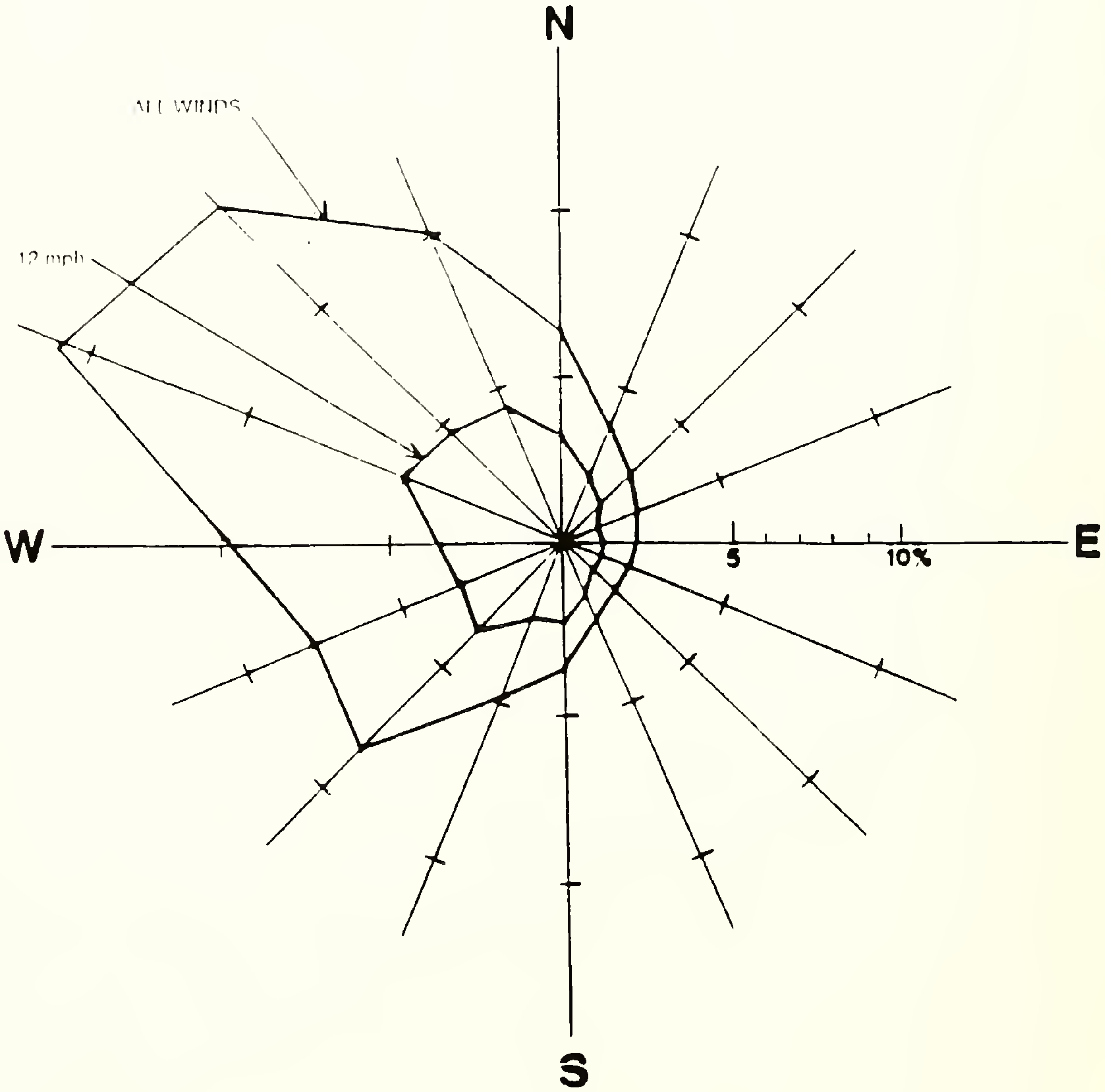


Figure A5. Boston Wind Rose for Winter (Dec., Jan., Feb.) Based on Surface Data from Logan Airport: 1945 -1965

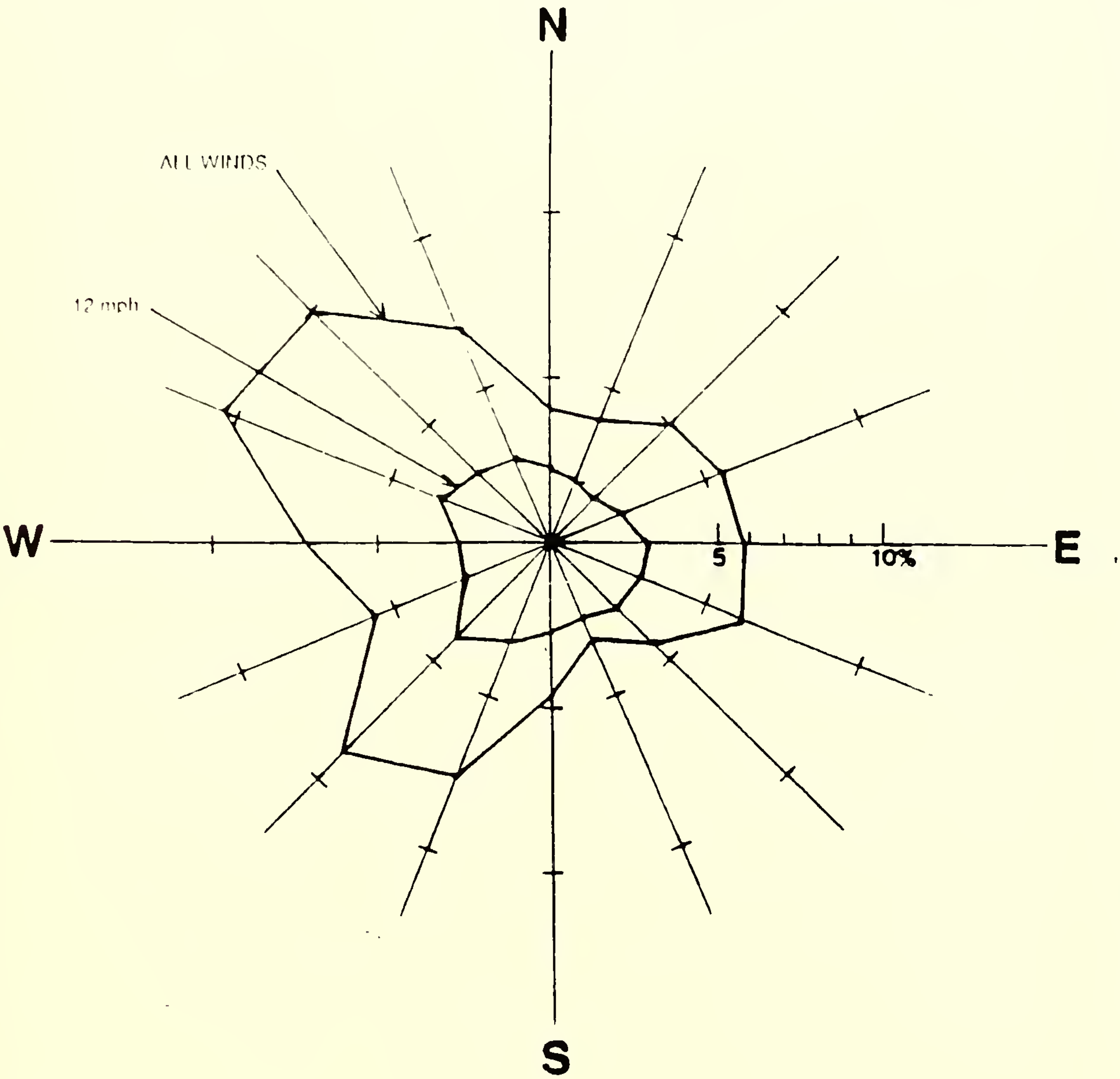


Figure A6. Boston Wind Rose for Spring (Mar., Apr., May) Based on Surface Data from Logan Airport: 1945 -1965

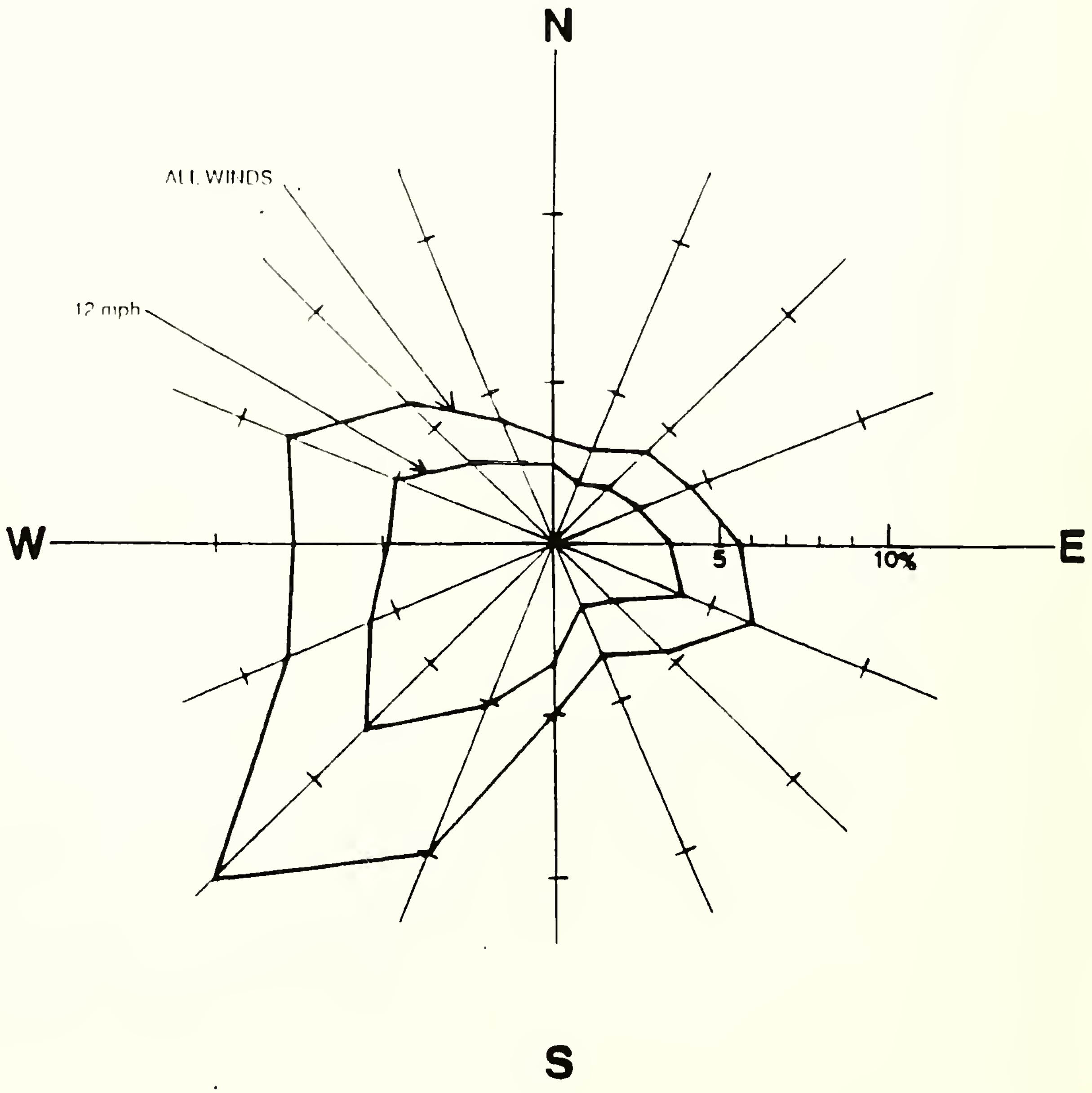


Figure A7. Boston Wind Rose for Summer (Jun., Jul., Aug.) Based on Surface Data from Logan Airport: 1945 -1965 -

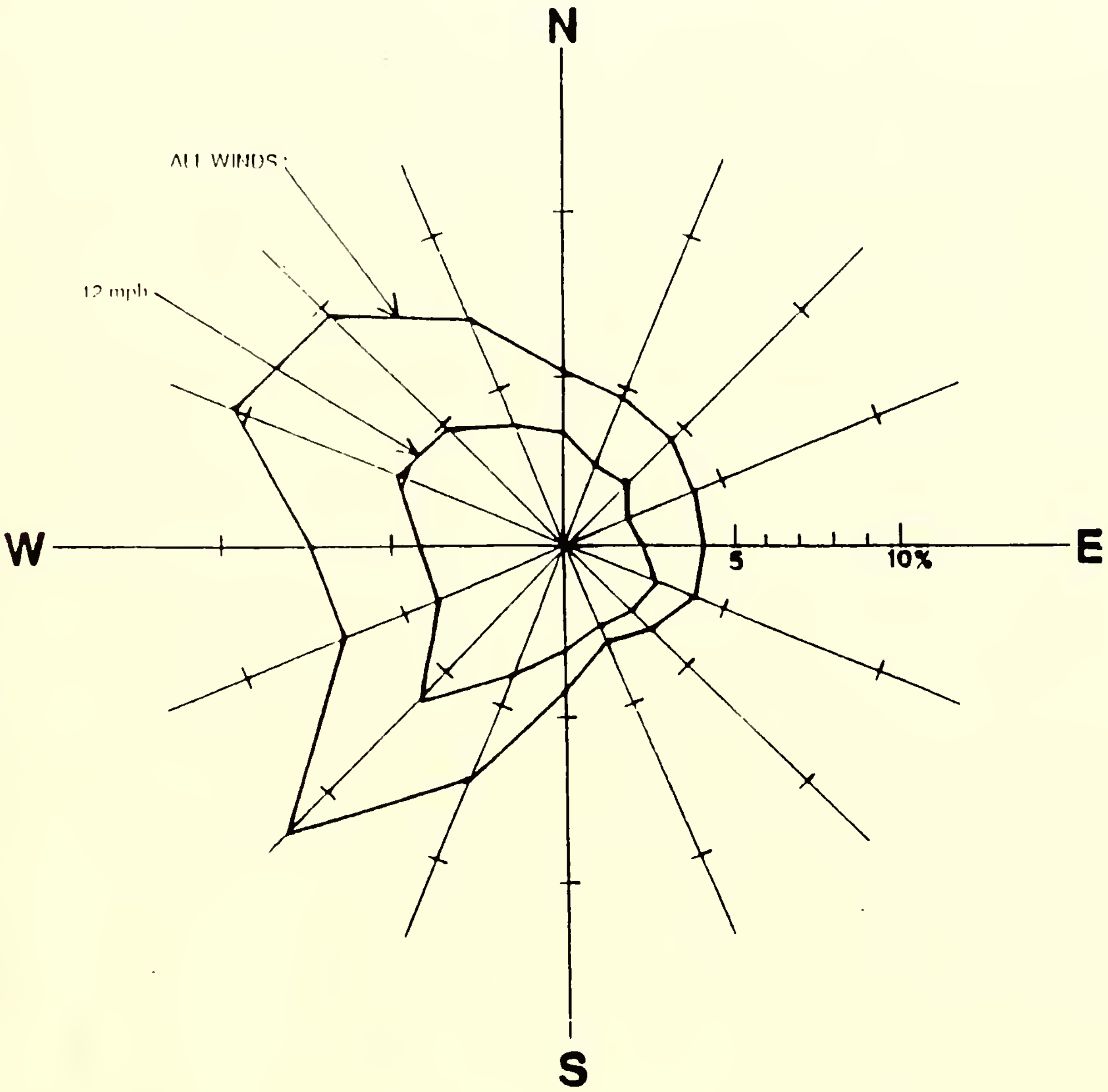
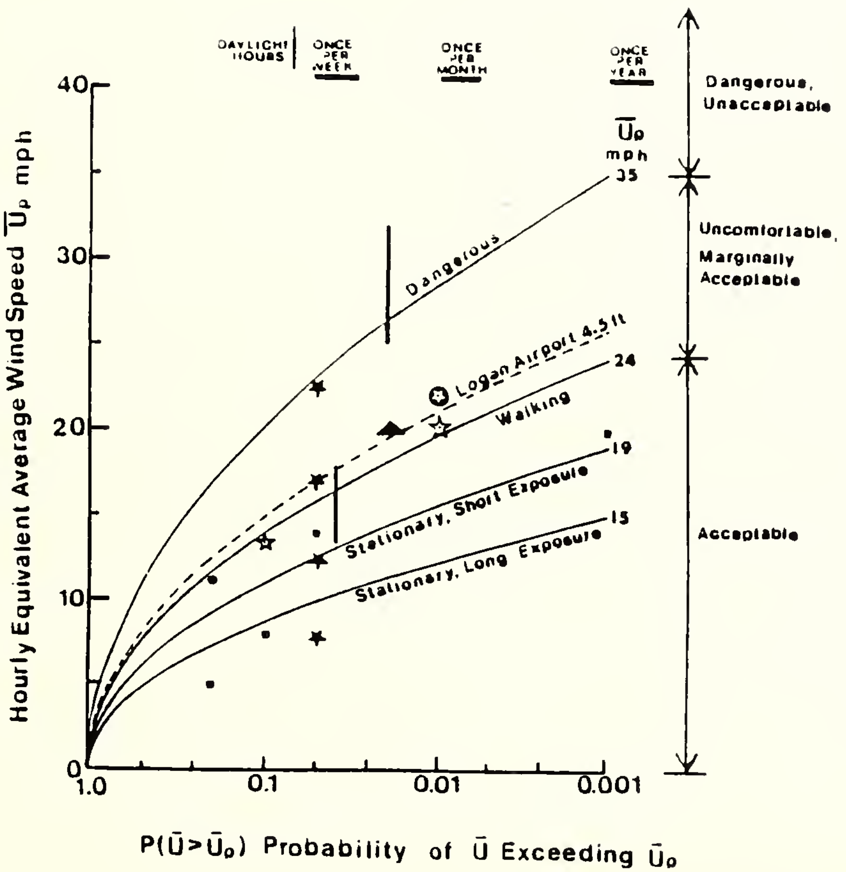


Figure A8. Boston Wind Rose for Fall (Sep., Oct., Nov.) Based on Surface Data from Logan Airport: 1945 -1965



Criteria		Symbol
MELBOURNE [31]		
DAVENPORT [7]		
Acceptable for:		
Walking fast	If $P(\bar{u} > 22.4)^* < 0.05$	★
Strolling	If $P(\bar{u} > 16.8) < 0.05$	★
Standing, Sitting Short Exposure	If $P(\bar{u} > 12.3) < 0.05$	★
Standing, Sitting Long Exposure	If $P(\bar{u} > 7.3) < 0.05$	★
PENWARDEN AND WISE [12]		
Acceptable	If $P(\bar{u} > 11.2) < 0.2$	●
LAWSON [32]		
Acceptable	If $P(\bar{u} > 13.4$ to $17.8) < 0.04$	—
Unacceptable	If $P(\bar{u} > 24.6$ to $31.3) < 0.02$	═
HUNT, POULTON AND MUMFORD [31]		
Acceptable for Strolling	If $P(\bar{u} > 13.4) < 0.1$	☆
Acceptable for Walking	If $P(\bar{u} > 20.1) < 0.01$	☆
PADOVSKY AND DURGIN [14]		
Acceptable	If $P(\bar{u} > 20.1) < 0.02$	▲
COHEN et al [3]		
Unacceptable Limit for safety	If $P(\bar{u} > 20) < 0.001$	●
Acceptable for: Walking	If $P(\bar{u} > 14) < 0.05$	■
Strolling (short exposure)	If $P(\bar{u} > 8) < 0.10$	●
Sitting (long exposure)	If $P(\bar{u} > 5) < 0.20$	●
BRA Guidelines**	$P(\bar{u} > 22) < 0.01$	✪
Conditions at Logan Airport		- - - -

*ALL velocities in mph
**Converted to average hourly winds

Figure A9. Melbourne's Criteria for Pedestrian Level Winds with Comparisons to Criteria of Other Authors

TABLE A1

MASSACHUSETTS COLLEGE OF PHARMACY
AND ALLIED HEALTH SCIENCES

EROSION GRADIENT WIND SPEEDS (MPH) FOR EACH DIRECTION
FOR EACH STATION FOR THE ALTERNATIVE B BUILDING

STA	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	WNW	N
1	>40	30	30	30	30	30	40	40	>40	>40	>40	>40	>40	>40	>40	>40
2	>40	>40	>40	>40	>40	>40	>40	>40	>40	>40	40	40	30	30	30	40
3	30	30	40	30	40	>40	>40	40	>40	>40	>40	>40	>40	>40	30	23
4	30	30	40	40	40	40	>40	>40	>40	>40	>40	>40	>40	>40	40	30
5	40	40	40	40	40	>40	>40	>40	>40	40	>40	40	>40	>40	>40	40
6	>40	40	40	40	>40	>40	>40	>40	40	40	30	40	>40	>40	>40	>40
7	23	23	23	23	23	30	30	30	40	>40	>40	>40	>40	40	23	23
8	23	17	30	23	40	40	>40	>40	40	40	40	30	30	30	23	23
9	23	23	23	30	23	23	30	30	30	40	40	>40	>40	>40	40	23
10	30	23	30	30	40	40	23	30	30	30	30	40	23	30	30	23
11	40	40	40	30	40	40	40	40	>40	40	>40	>40	>40	>40	>40	40
12	>40	40	>40	>40	>40	>40	>40	>40	>40	40	40	40	40	30	40	40
13	40	40	40	30	30	40	23	30	30	30	30	40	30	30	23	23
14	>40	>40	>40	>40	>40	>40	>40	>40	>40	40	40	30	30	30	40	40
15	>40	30	23	30	23	40	40	40	>40	>40	40	30	>40	>40	>40	>40
16	>40	>40	40	30	40	>40	40	>40	>40	>40	>40	>40	>40	>40	40	40
17	>40	>40	>40	>40	40	40	>40	30	40	40	40	40	40	40	>40	>40
18	>40	>40	>40	>40	>40	>40	40	40	23	23	30	40	>40	>40	>40	>40
19	>40	>40	>40	>40	30	30	30	30	30	23	23	30	40	>40	>40	>40
20	>40	>40	>40	>40	40	40	23	40	30	23	23	23	30	30	30	>40
21	>40	>40	40	>40	40	40	23	40	>40	40	>40	>40	>40	>40	30	>40
22	>40	>40	40	40	30	40	40	40	40	>40	40	>40	>40	>40	40	40
23	40	30	40	30	40	40	>40	>40	40	30	40	40	30	30	30	40
24	40	30	>40	40	40	40	40	>40	>40	>40	>40	>40	40	40	40	40
25	30	40	>40	>40	>40	>40	>40	>40	>40	>40	>40	>40	>40	>40	40	40
26	40	40	30	>40	>40	>40	>40	>40	>40	>40	40	40	>40	>40	>40	40
27	40	>40	30	30	>40	>40	>40	>40	>40	>40	>40	40	>40	>40	30	30
28	>40	>40	40	30	30	30	40	30	30	23	30	30	40	40	40	>40

NO.	DIRECTION	An	Kn	Un(mph)
1	NNE	0.0385	1.76	20.97
2	NE	0.0410	1.76	24.04
3	ENE	0.0404	1.72	22.19
4	E	0.0443	1.74	20.15
5	ESE	0.0469	2.26	19.56
6	SE	0.0379	2.47	17.90
7	SSE	0.0313	2.14	16.26
8	S	0.0447	2.04	18.94
9	SSW	0.0750	2.02	21.69
10	SW	0.1098	2.35	21.79
11	WSW	0.0730	2.29	20.87
12	W	0.0815	2.22	22.87
13	WNW	0.1149	2.21	24.28
14	NW	0.1017	2.34	25.08
15	NNW	0.0717	2.48	22.78
16	N	0.0475	1.99	19.87
17	ALL	1.0000	2.05	22.10

Table A3. Weibull Coefficients for Annual Gradient Winds in Boston

NO.	DIRECTION	An	Kn	Un(mph)
1	NNE	0.0363	1.72	21.13
2	NE	0.0289	1.43	24.10
3	ENE	0.0226	1.60	26.45
4	E	0.0221	1.56	23.01
5	ESE	0.0208	1.49	18.45
6	SE	0.0219	1.96	18.16
7	SSE	0.0259	1.78	17.52
8	S	0.0373	1.78	18.33
9	SSW	0.0498	2.06	22.35
10	SW	0.0855	2.46	23.60
11	WSW	0.0780	2.69	23.35
12	W	0.0996	2.66	26.10
13	WNW	0.1613	2.36	27.03
14	NW	0.1444	2.42	27.30
15	NNW	0.1004	2.66	24.38
16	N	0.0652	2.41	22.51
17	ALL	1.0000	1.66	19.83

Table A4. Weibull Coefficients for Winter (Dec., Jan., Feb.) Gradient Winds in Boston

NO.	DIRECTION	An	Kn	Un(mph)
1	NNE	0.0404	1.99	22.77
2	NE	0.0516	2.03	26.70
3	ENE	0.0566	1.82	24.09
4	E	0.0586	2.00	22.07
5	ESE	0.0609	2.53	22.04
6	SE	0.0436	2.48	19.22
7	SSE	0.0317	2.07	16.92
8	S	0.0459	2.15	20.81
9	SSW	0.0756	2.17	24.40
10	SW	0.0893	2.40	23.18
11	WSW	0.0570	2.20	22.39
12	W	0.0730	2.34	25.77
13	WNW	0.1047	2.47	26.48
14	NW	0.1004	2.61	27.06
15	NNW	0.0700	2.82	24.73
16	N	0.0407	1.86	20.50
17	ALL	1.0000	2.17	23.42

Table A5. Weibull Coefficients for Spring (Mar., Apr., May) Gradient Winds in Boston

NO.	DIRECTION	An	Kn	Un(mph)
1	NNE	0.0304	1.69	18.10
2	NE	0.0384	2.36	19.79
3	ENE	0.0423	2.21	18.24
4	E	0.0547	3.10	18.75
5	ESE	0.0641	3.13	18.55
6	SE	0.0498	2.78	17.15
7	SSE	0.0364	2.76	14.52
8	S	0.0521	2.16	18.03
9	SSW	0.1009	2.67	21.53
10	SW	0.1448	2.49	20.16
11	WSW	0.0856	2.41	18.49
12	W	0.0778	2.20	18.73
13	WNW	0.0876	2.13	19.26
14	NW	0.0614	2.42	21.17
15	NNW	0.0417	2.29	18.95
16	N	0.0320	2.24	17.56
17	ALL	1.0000	2.24	18.97

Table A6. Weibull Coefficients for Summer (Jun., Jul., Aug.) Gradient Winds in Boston

NO.	DIRECTION	An	Kn	Un(mph)
1	NNE	0.0469	1.71	21.26
2	NE	0.0450	1.68	23.79
3	ENE	0.0402	1.92	22.88
4	E	0.0419	1.52	20.03
5	ESE	0.0419	2.56	18.93
6	SE	0.0362	2.51	16.81
7	SSE	0.0311	2.57	16.60
8	S	0.0435	2.22	17.83
9	SSW	0.0738	1.55	18.08
10	SW	0.1194	2.20	21.20
11	WSW	0.0715	2.27	20.03
12	W	0.0755	2.16	20.25
13	WNW	0.1060	2.20	21.73
14	NW	0.1004	2.23	22.11
15	NNW	0.0748	2.29	21.26
16	N	0.0519	2.07	18.56
17	ALL	1.0000	1.70	18.72

Table A7. Weibull Coefficients for Fall (Sep., Oct., Nov.) Gradient Winds in Boston

TABLE A8

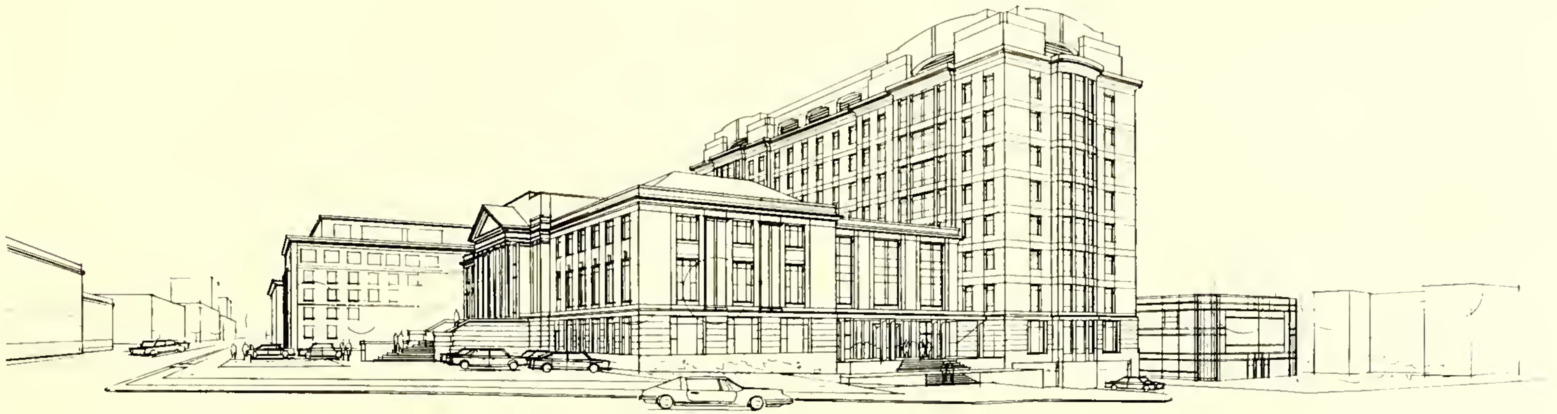
MASSACHUSETTS COLLEGE OF PHARMACY
AND ALLIED HEALTH SCIENCES

PERCENT CONTRIBUTION OF EACH DIRECTION TO
THE ANNUAL 100-HOUR RETURN PERIOD EQUIVALENT
AVERAGE WIND SPEED FOR EACH STATION FROM AN
EROSION STUDY OF THE ALTERNATIVE B BUILDING

STA	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
1	0	42	31	21	5	1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	1	47	42	10	0
3	13	29	3	12	0	0	0	0	0	0	0	0	0	0	8	35
4	25	48	8	4	0	0	0	0	0	0	0	0	0	0	1	15
5	12	27	19	11	1	0	0	0	0	9	0	15	0	0	0	5
6	0	20	14	8	0	0	0	0	9	4	36	9	0	0	0	0
7	14	31	22	14	2	0	0	0	0	0	0	0	0	0	9	7
8	9	72	2	8	0	0	0	0	0	0	0	0	1	1	4	3
9	18	37	27	3	3	0	0	0	2	0	0	0	0	0	0	9
10	2	32	4	2	0	0	0	0	2	0	0	0	48	3	0	7
11	9	22	15	41	1	0	0	2	0	6	0	0	0	0	0	4
12	0	11	0	0	0	0	0	0	0	1	0	3	8	76	1	1
13	0	2	1	6	0	0	1	1	6	2	1	0	16	13	32	18
14	0	0	0	0	0	0	0	0	0	0	0	19	43	38	0	0
15	0	21	49	8	13	0	0	0	0	0	0	10	0	0	0	0
16	0	2	23	55	2	0	0	0	0	0	0	0	0	0	10	0
17	0	1	1	0	1	0	0	19	11	5	3	11	26	23	0	0
18	0	0	0	0	0	0	0	0	51	48	2	0	0	0	0	0
19	0	0	0	0	1	0	0	1	9	53	28	8	1	0	0	0
20	O	0	0	0	0	0	1	0	4	27	14	37	9	7	0	0
21	0	1	15	0	1	0	22	1	0	5	0	0	0	0	54	0
22	0	2	20	12	25	0	0	3	17	0	5	0	0	0	8	6
23	1	24	2	10	0	0	0	0	0	7	0	0	30	26	0	0
24	6	57	0	5	0	0	0	0	0	0	0	0	15	13	2	2
25	52	30	1	0	0	0	0	0	0	0	0	0	0	0	9	6
26	9	21	54	0	0	0	0	0	0	0	3	10	0	0	0	3
27	4	0	34	23	0	0	0	0	0	0	0	0	0	0	23	14
28	0	0	2	8	1	0	0	1	11	63	3	10	1	1	0	0

APPENDIX F

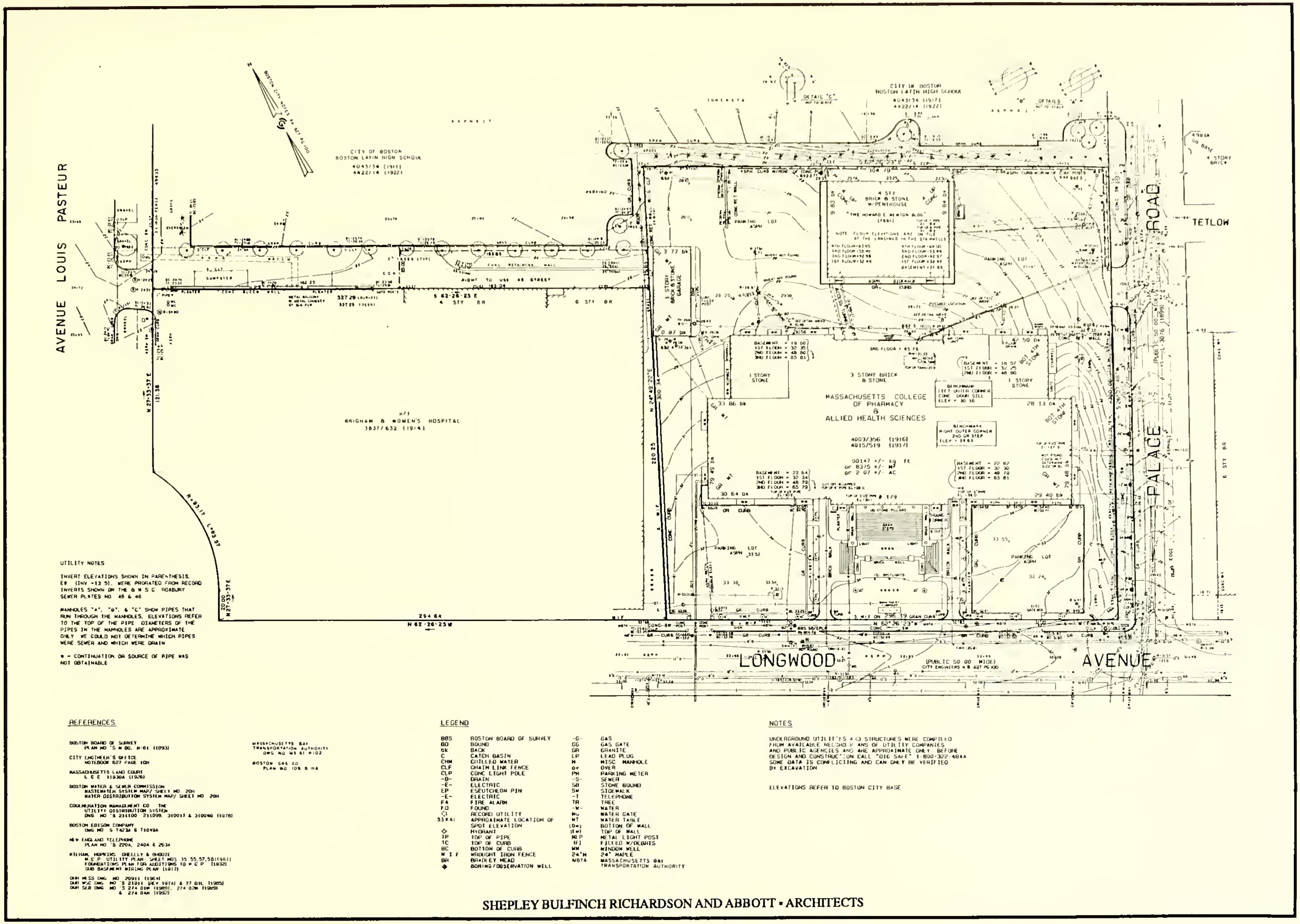
Revised Schematic Design Submission



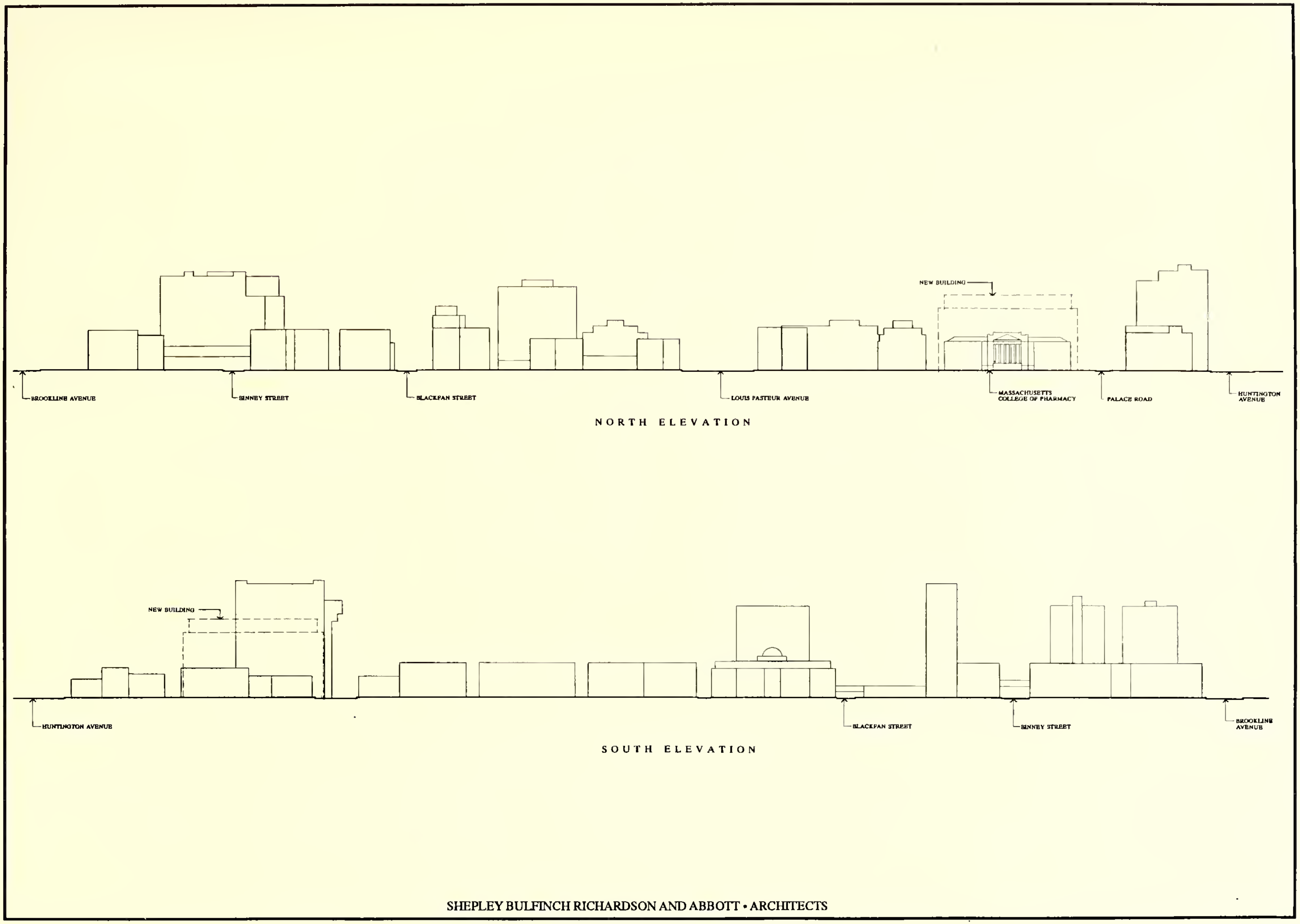
PERSPECTIVE FROM PALACE ROAD

SHEPLEY BULFINCH RICHARDSON AND ABBOTT • ARCHITECTS

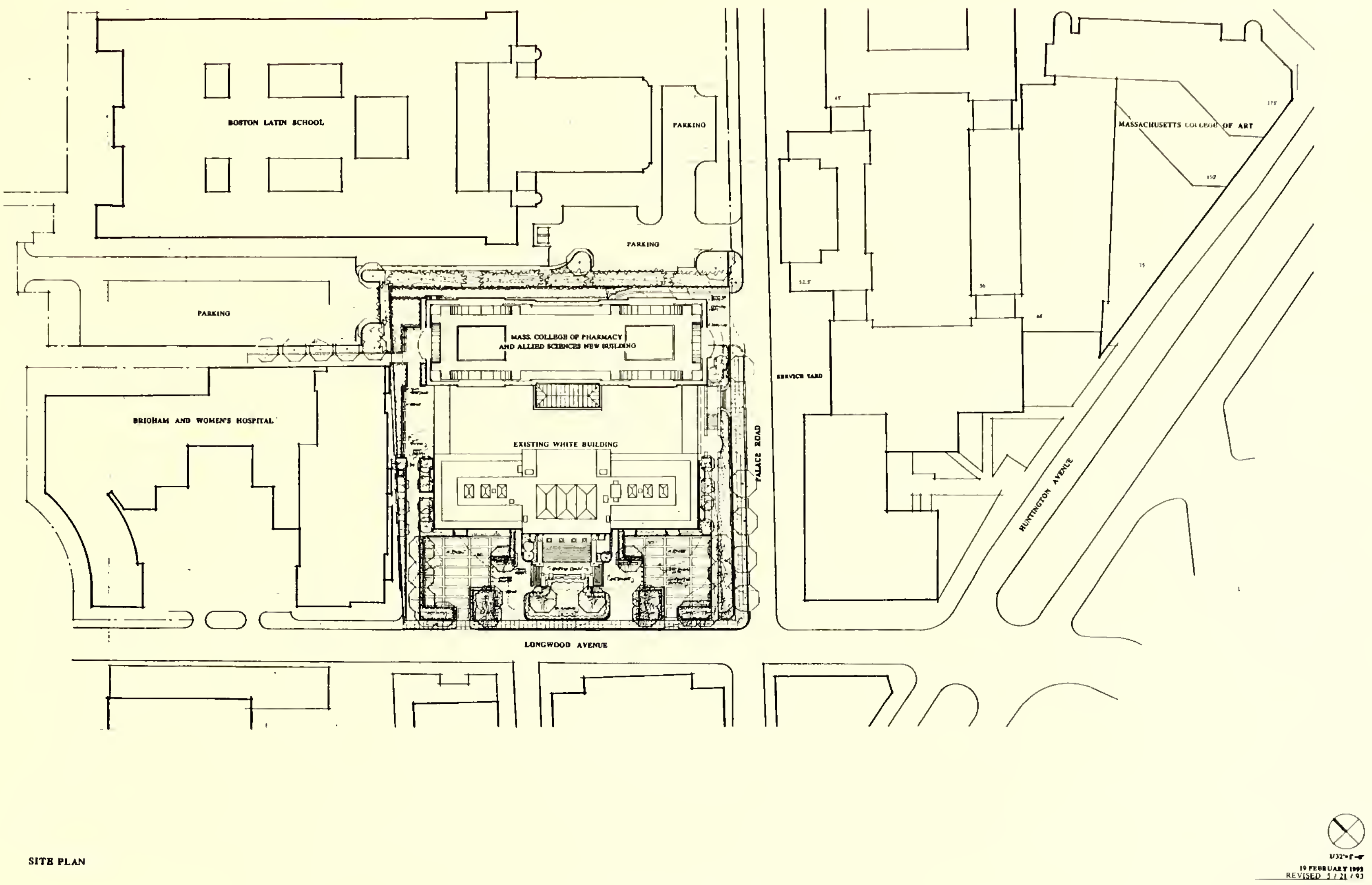
Eye Level Perspective
Massachusetts College of Pharmacy and Allied Health Sciences



Site Survey
Massachusetts College of Pharmacy and Allied Health Sciences

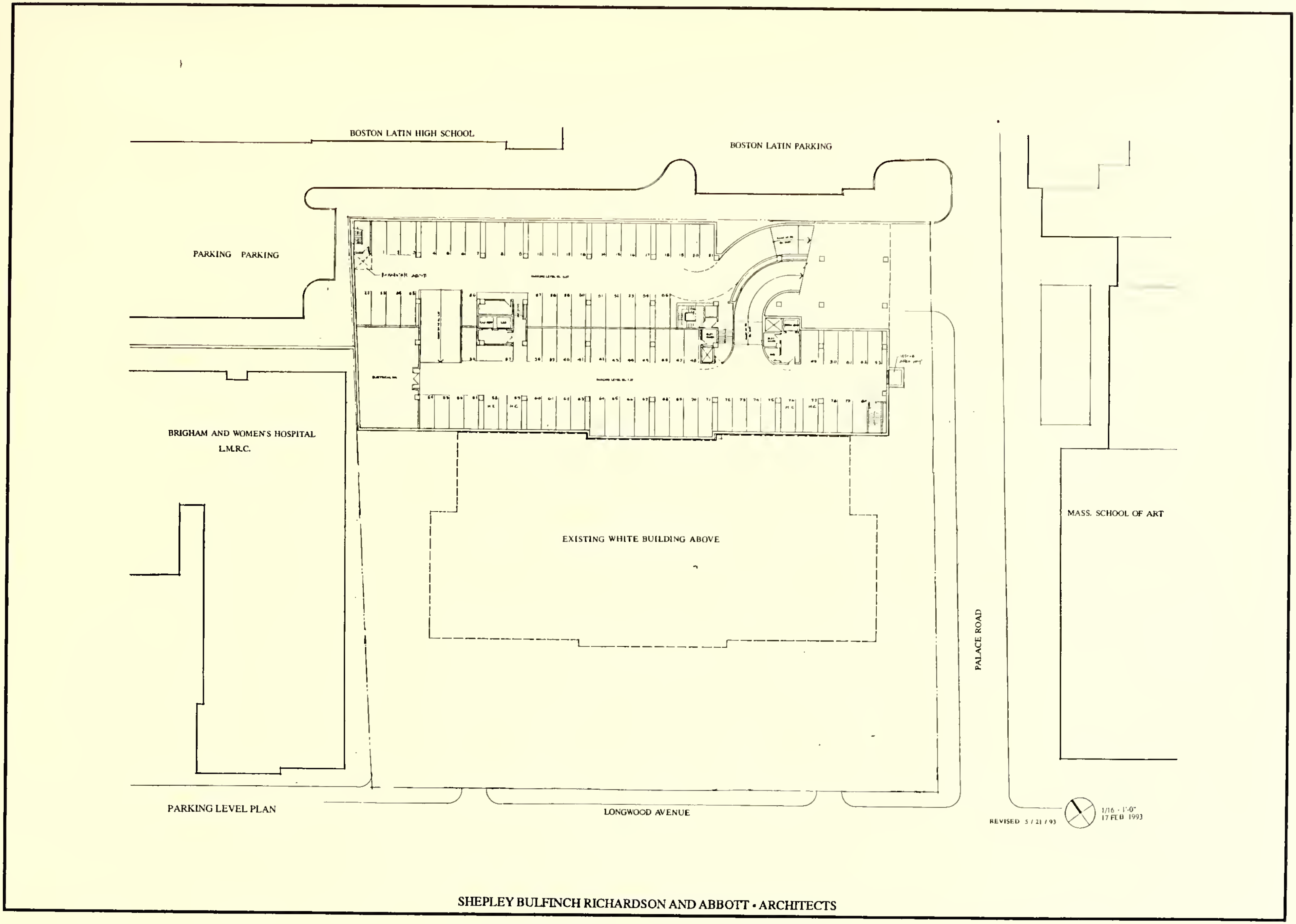


Site Context Section
Massachusetts College of Pharmacy and Allied Health Sciences

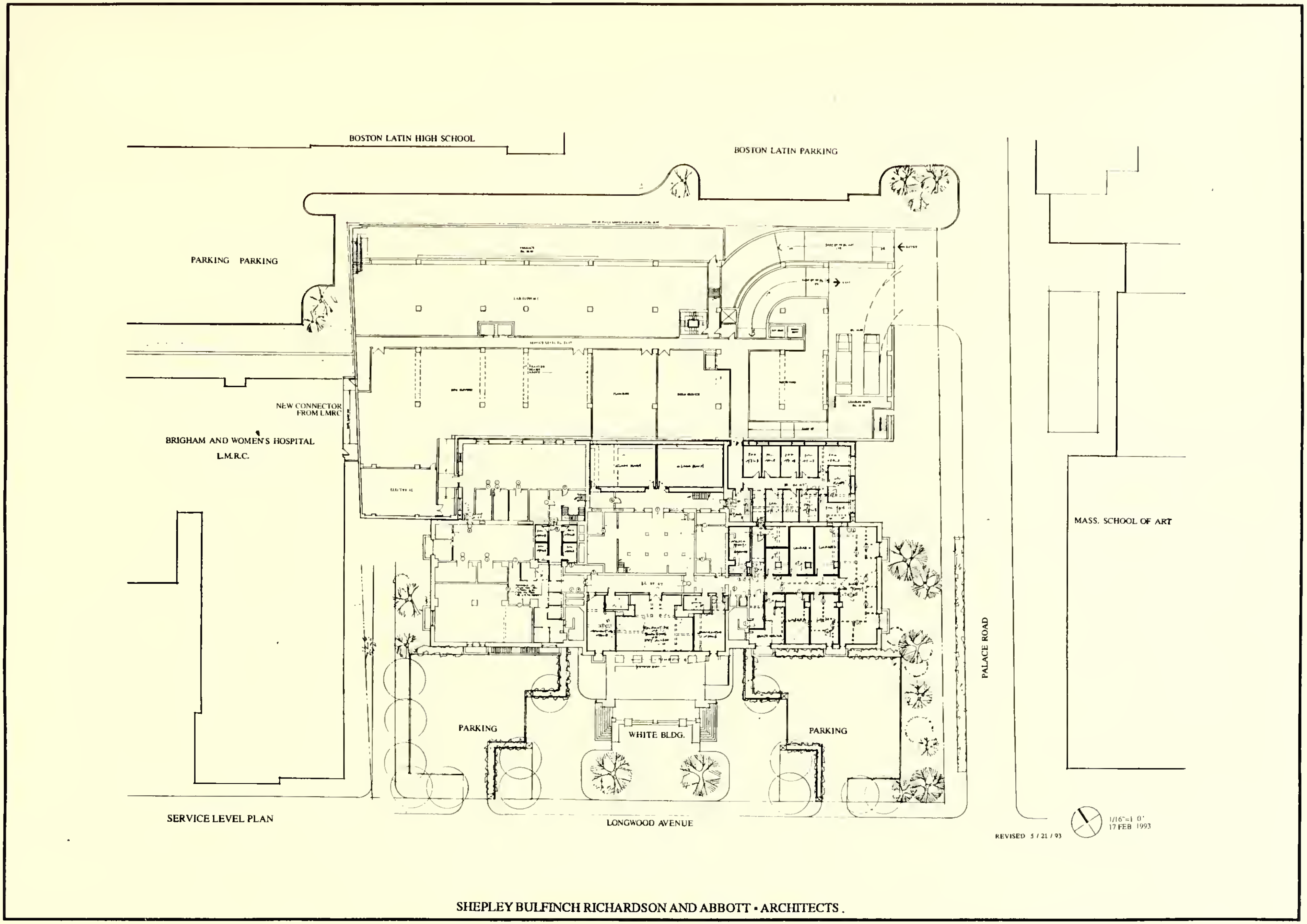


SHEPLEY BULFINCH RICHARDSON AND ABBOTT • ARCHITECTS

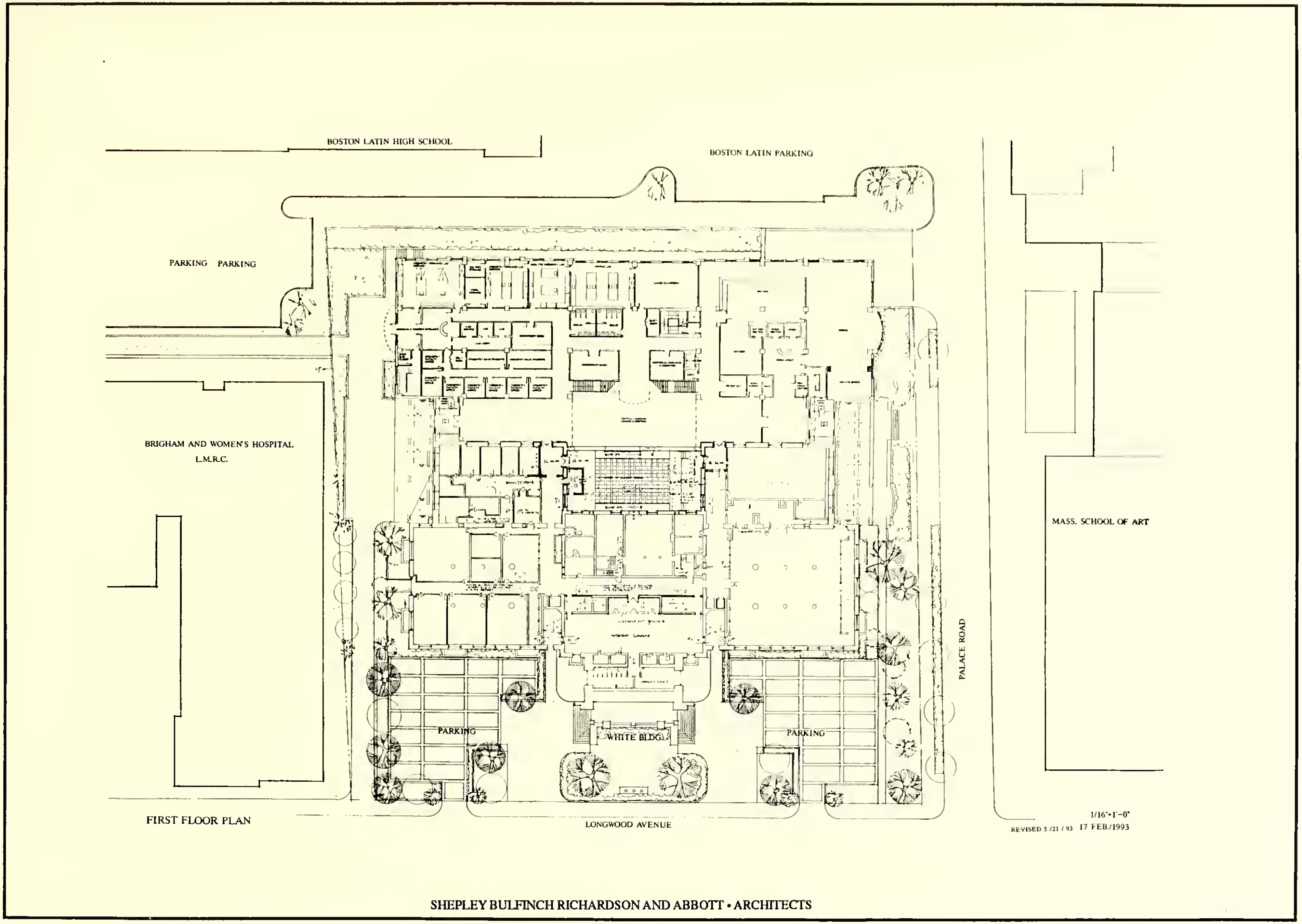
Site Context Plan
Massachusetts College of Pharmacy and Allied Health Sciences



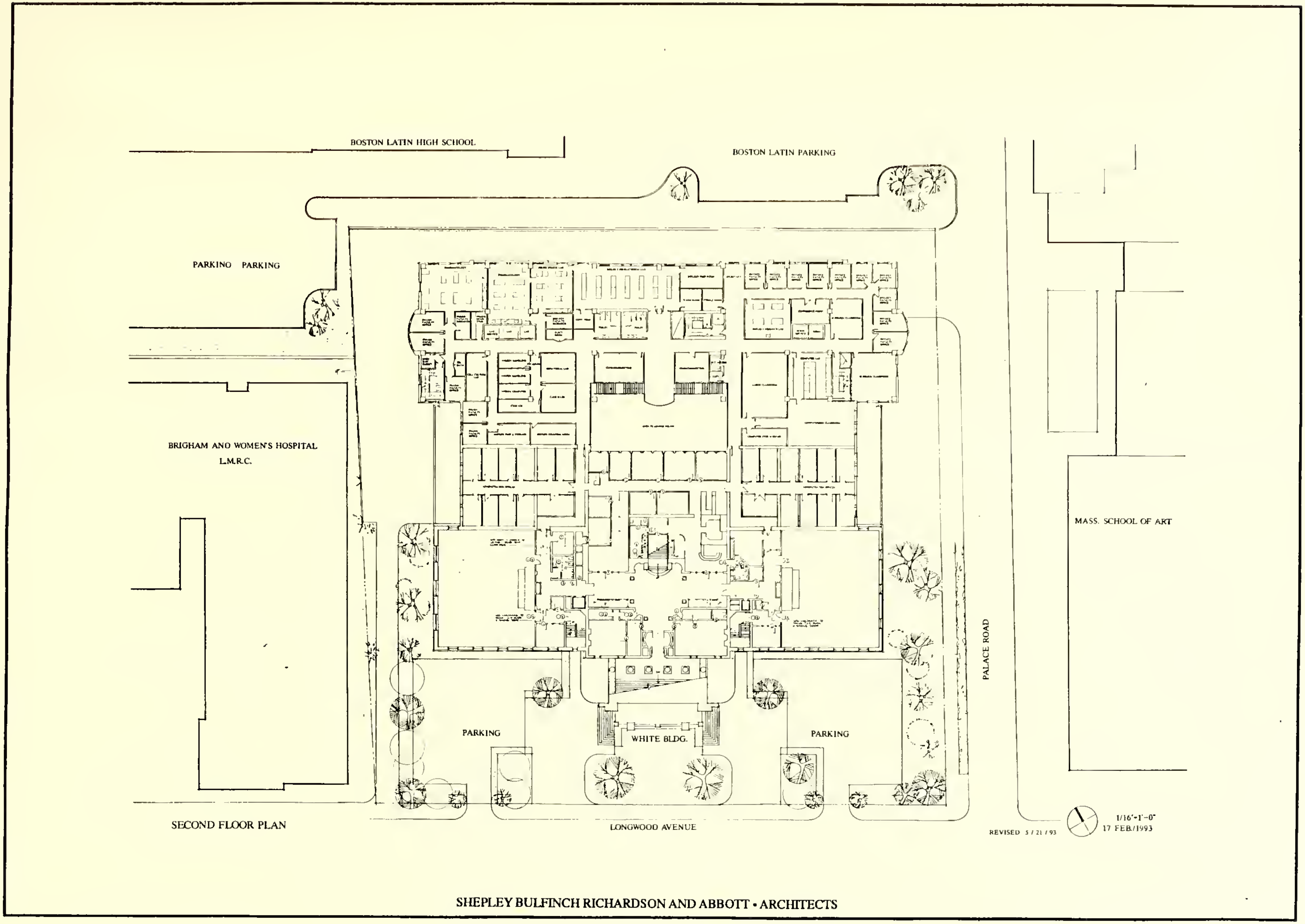
Parking Level Plan
Massachusetts College of Pharmacy and Allied Health Sciences



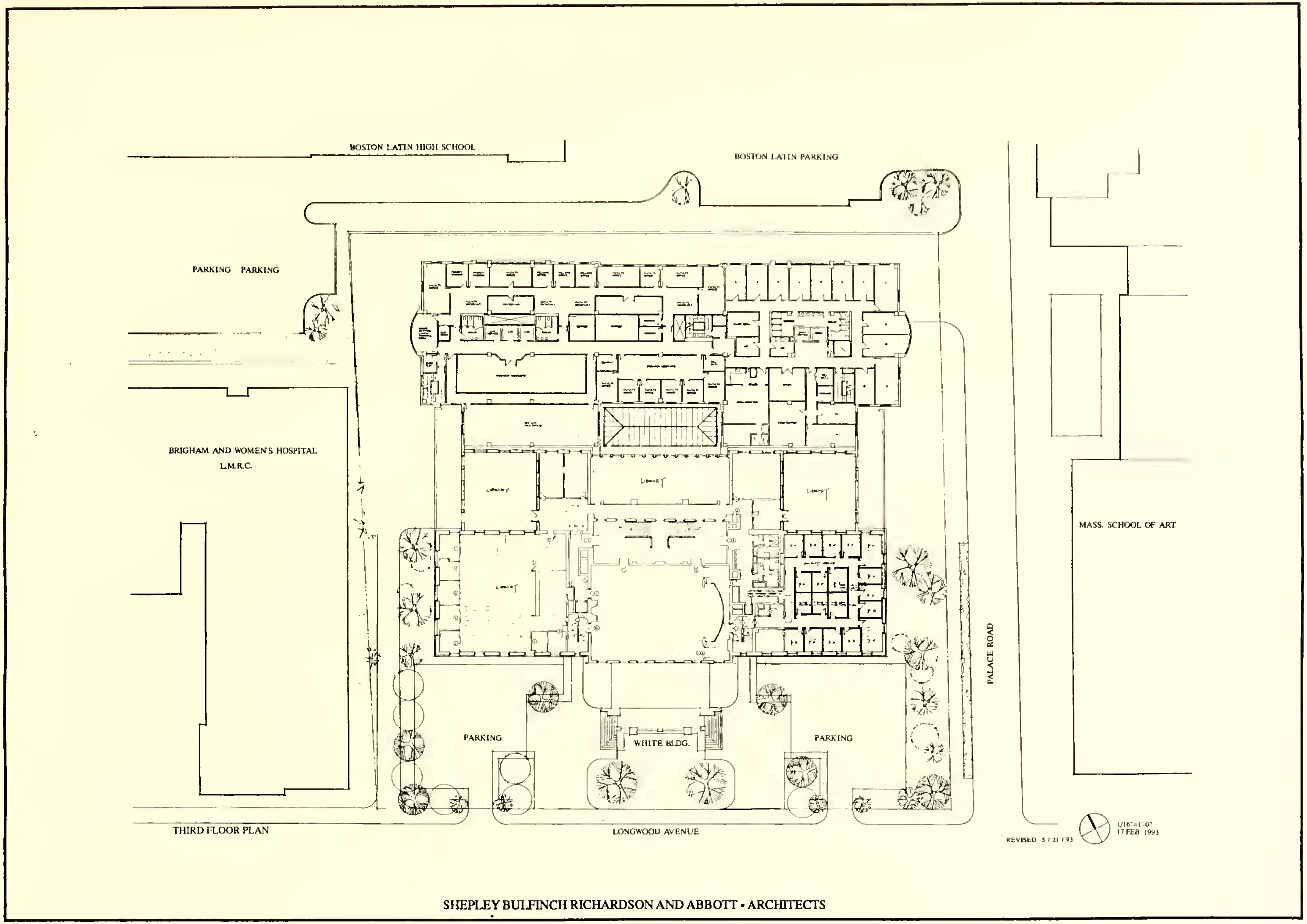
Service Level Plan
Massachusetts College of Pharmacy and Allied Health Sciences



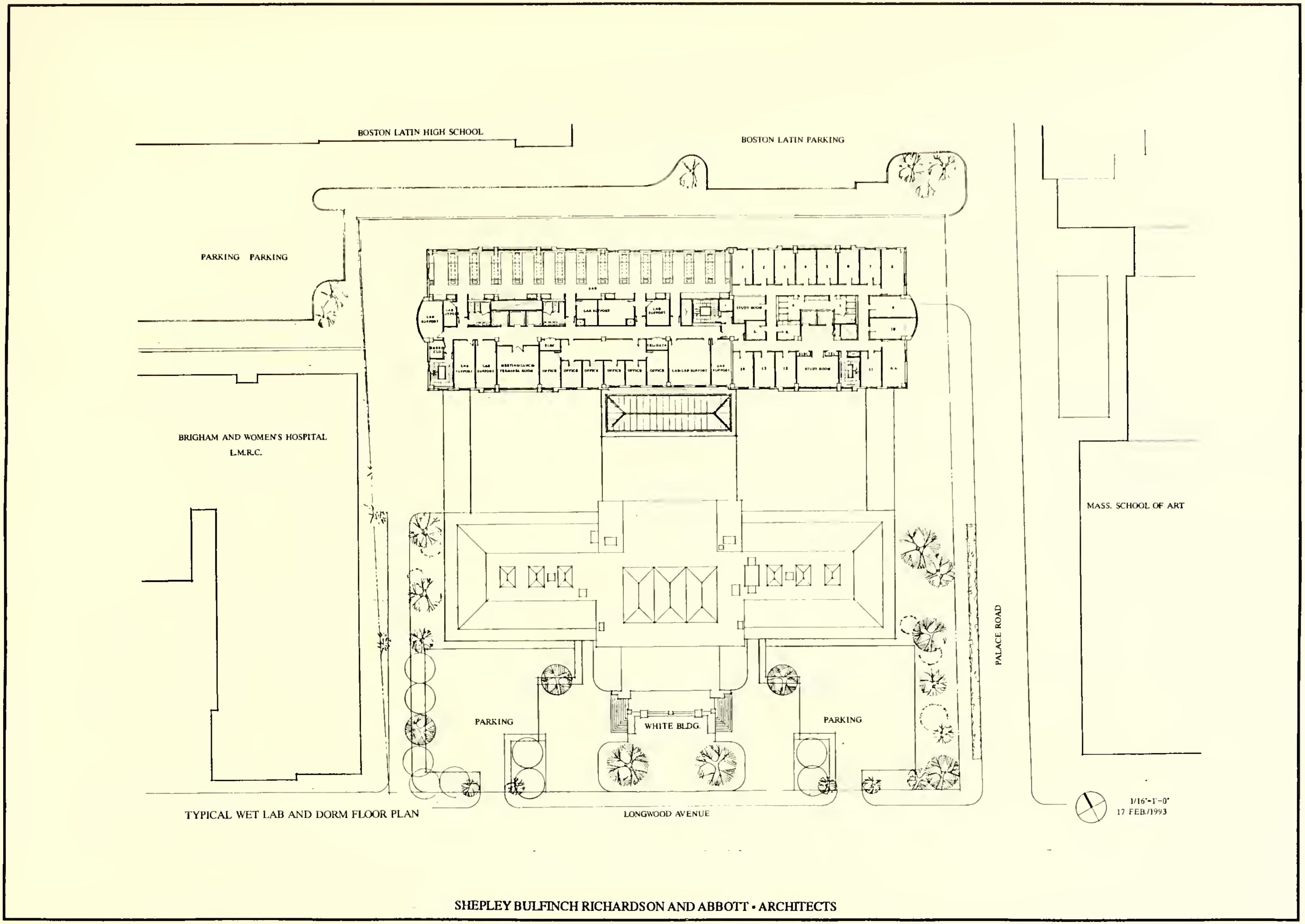
Site Plan/First Floor Plan
Massachusetts College of Pharmacy and Allied Health Sciences



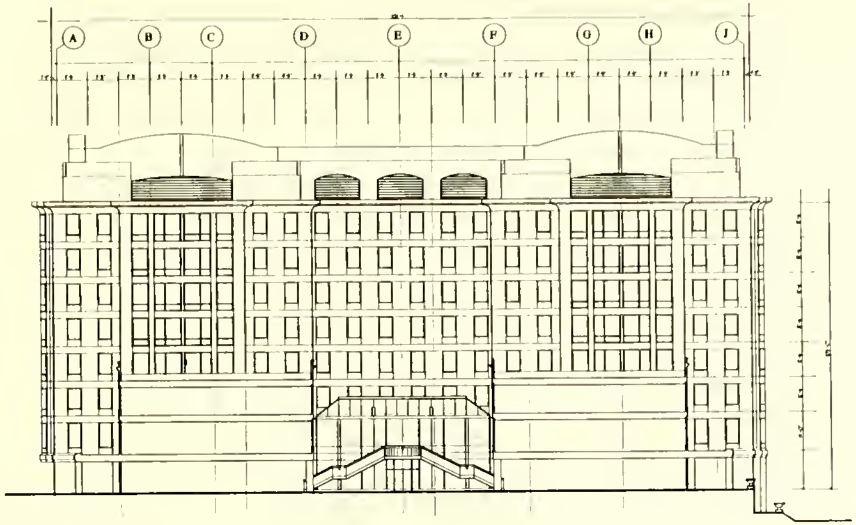
Second Floor Plan
Massachusetts College of Pharmacy and Allied Health Sciences



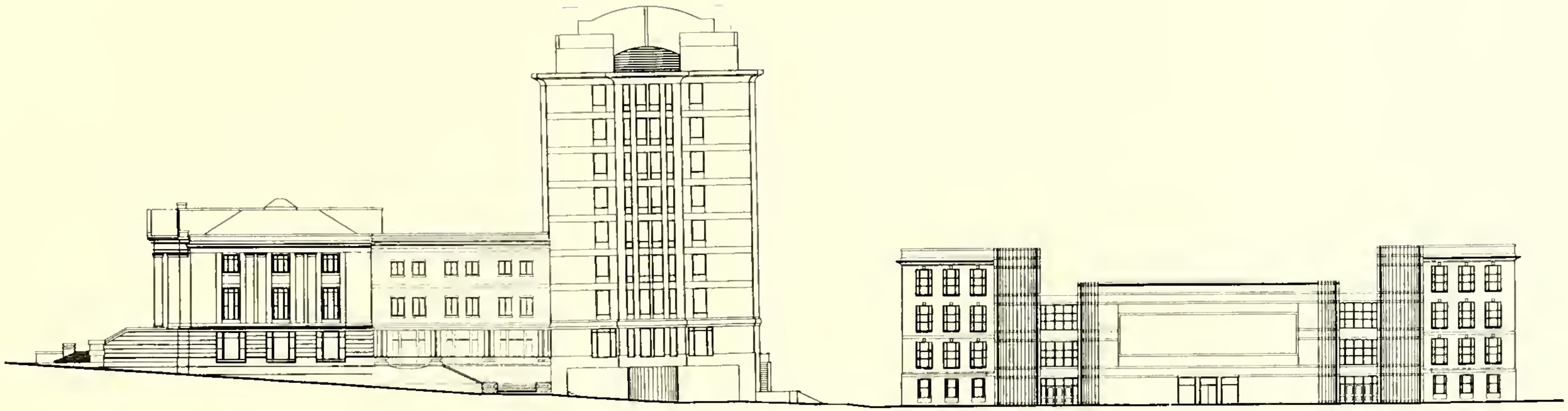
Third Floor Plan
Massachusetts College of Pharmacy and Allied Health Sciences



Typical Wet Lab and Dorm Floor Plan
Massachusetts College of Pharmacy and Allied Health Sciences



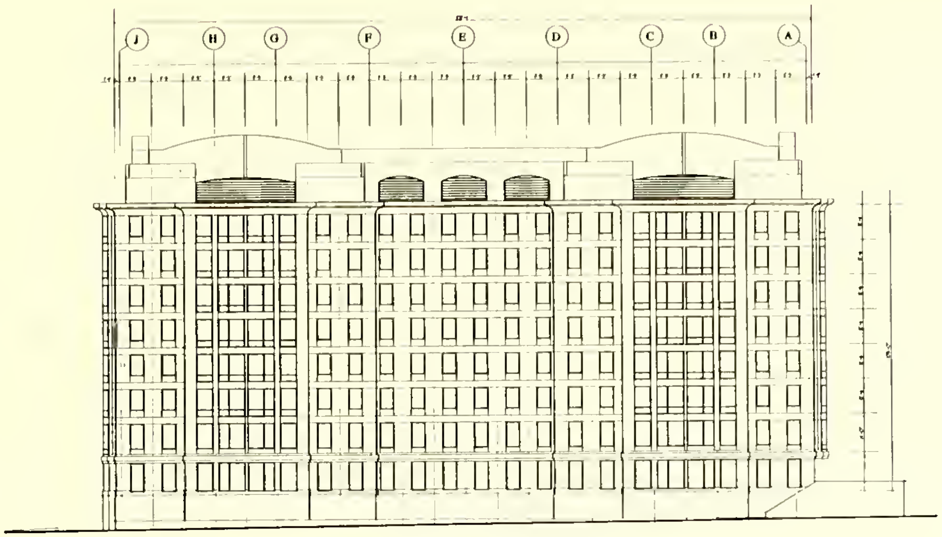
LONGWOOD AVENUE ELEVATION



PALACE ROAD ELEVATION

SHEPLEY BULFINCH RICHARDSON AND ABBOTT • ARCHITECTS

Building Elevations
Massachusetts College of Pharmacy and Allied Health Sciences

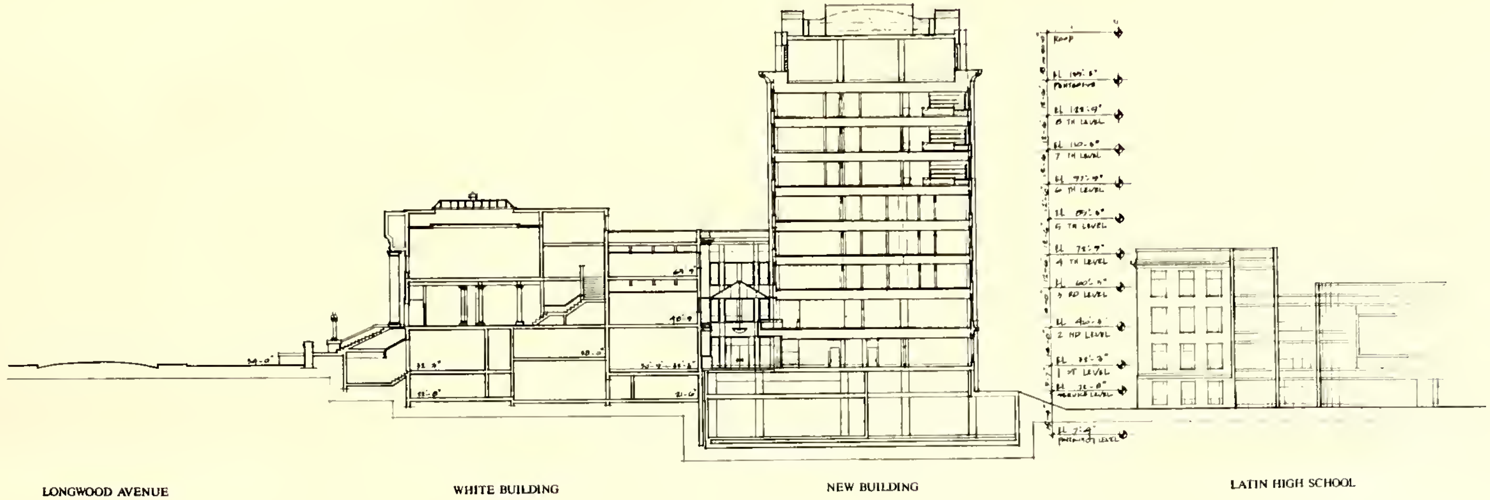


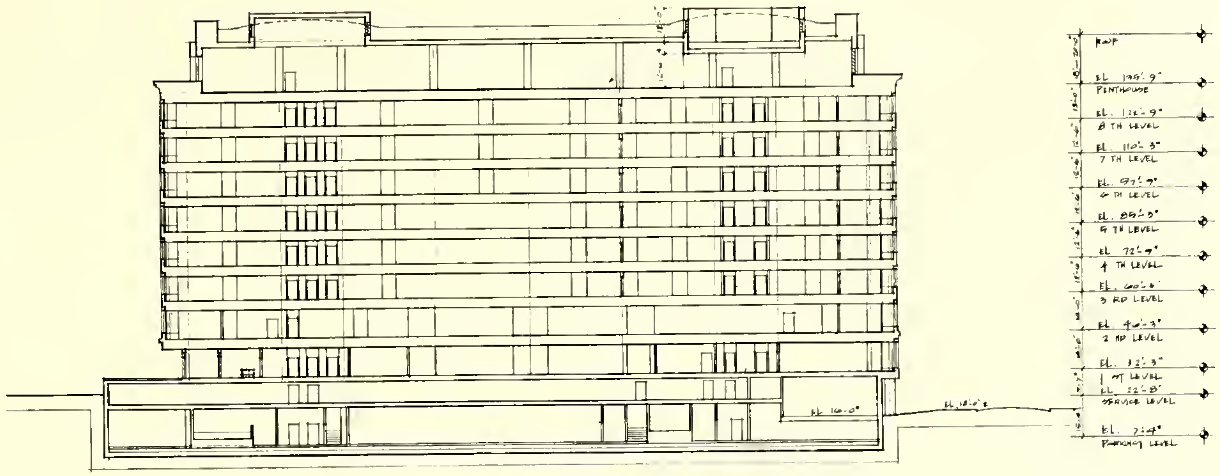
ELEVATION FACING BOSTON LATIN

LMRC ELEVATION

SHEPLEY BULFINCH RICHARDSON AND ABBOTT • ARCHITECTS

Building Elevations
Massachusetts College of Pharmacy and Allied Health Sciences





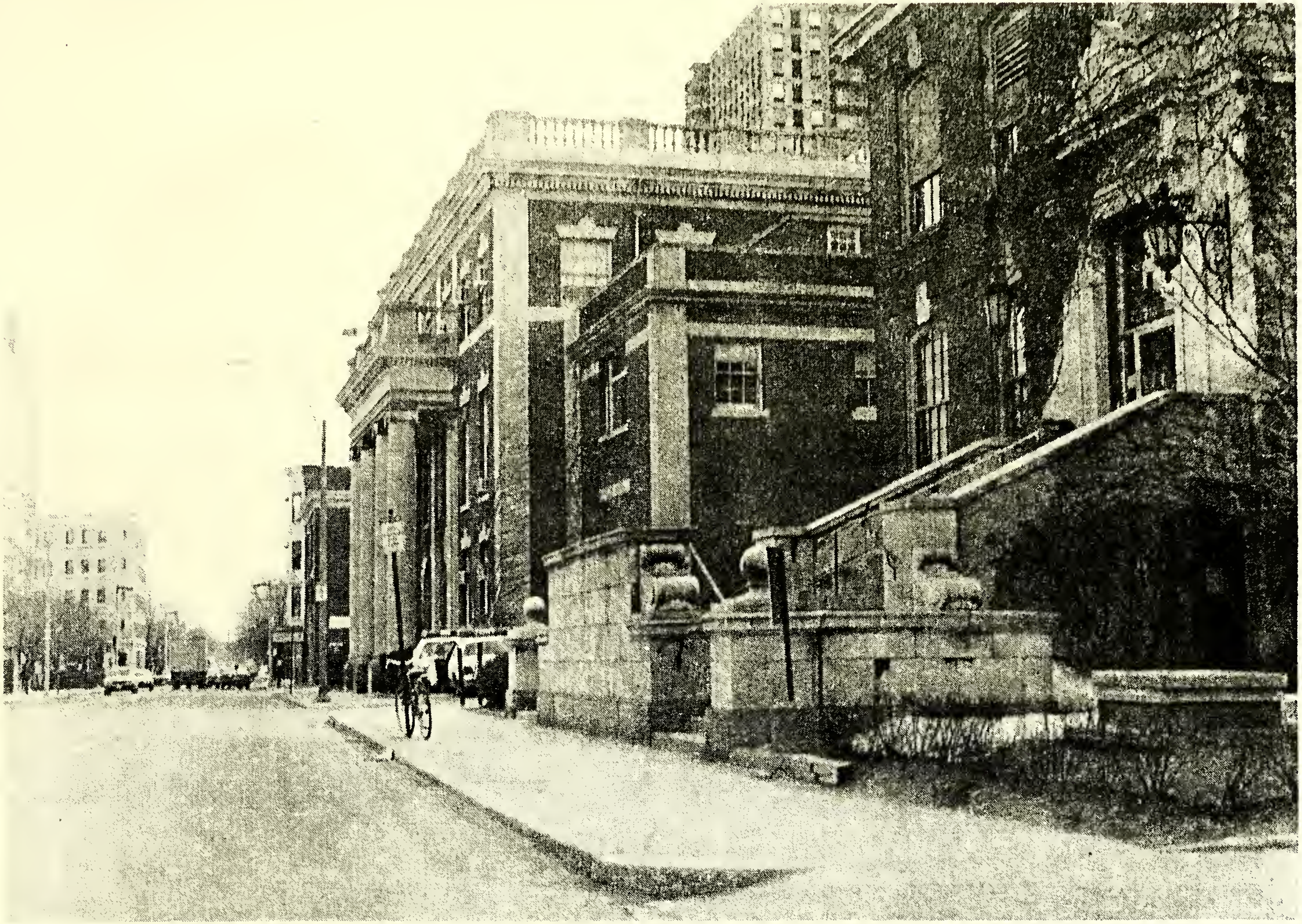
SHEPLEY BULFINCH RICHARDSON AND ABBOTT • ARCHITECTS

Sections
Massachusetts College of Pharmacy and Allied Health Sciences

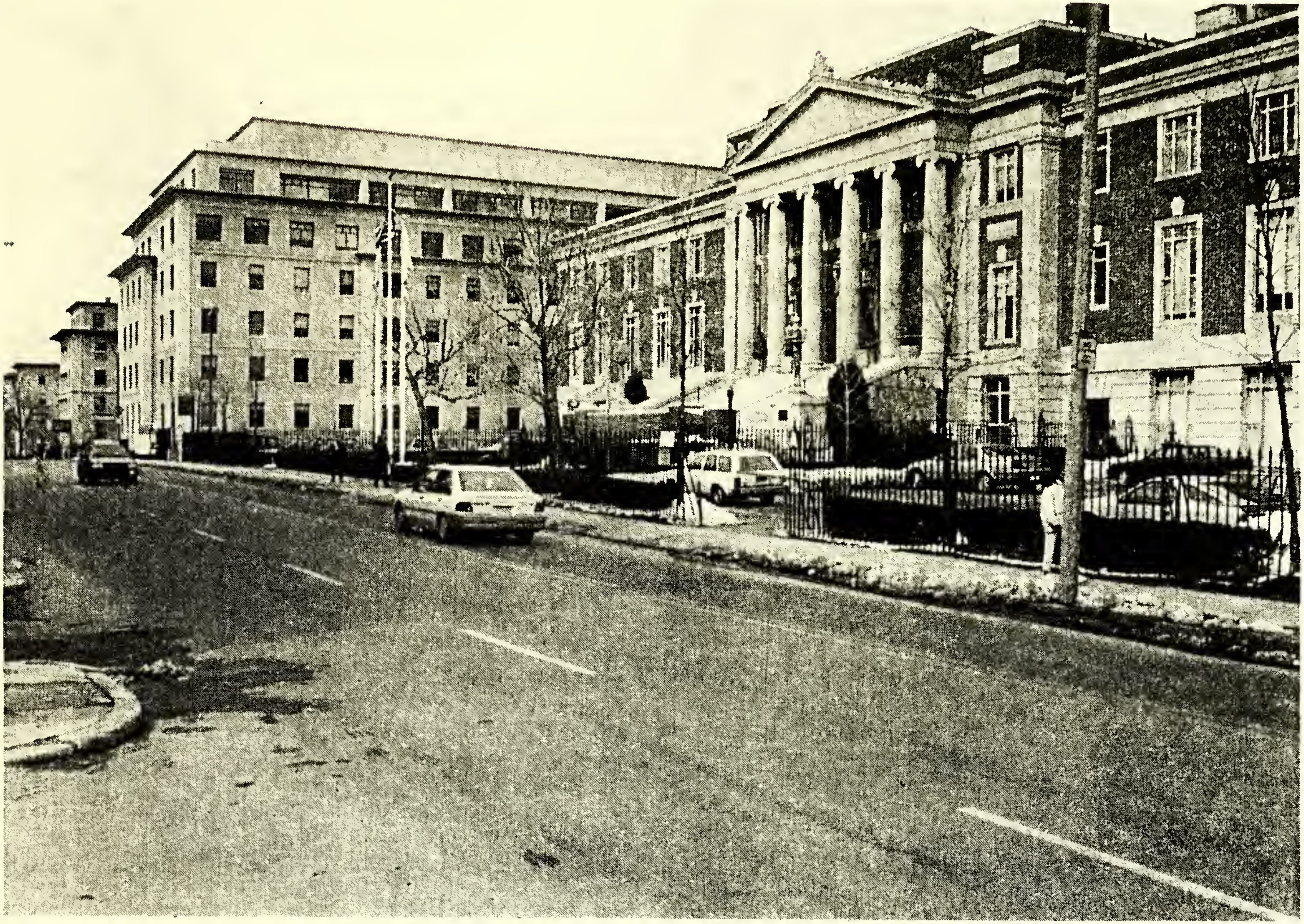
Longwood Avenue: The White Building
Massachusetts College of Pharmacy and Allied Health Sciences

Longwood Avenue: Looking West, White Building on Right
Massachusetts College of Pharmacy and Allied Health Sciences

Looking West on Longwood (Corner of Palace Road on Right)
Massachusetts College of Pharmacy and Allied Health Sciences

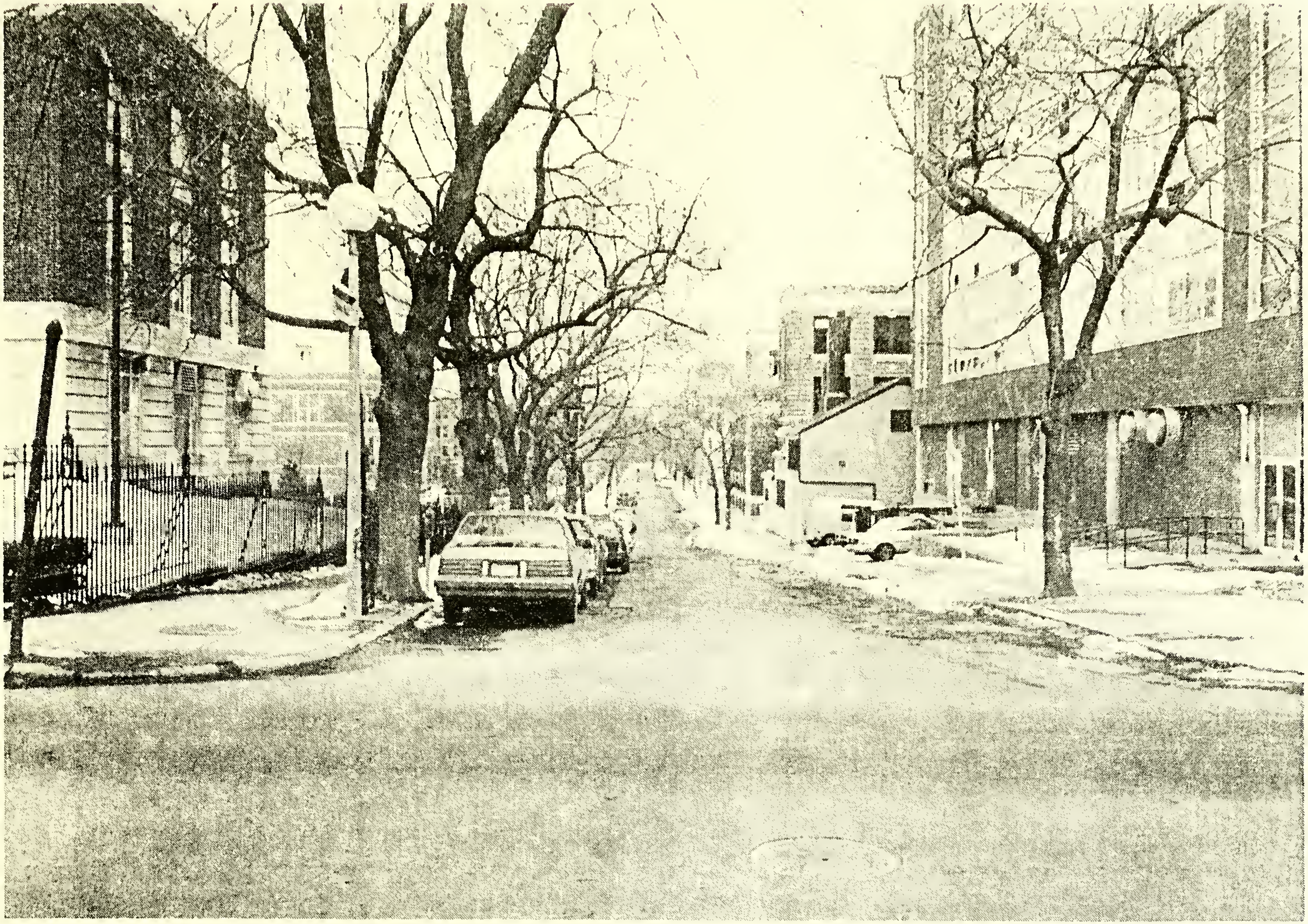


Looking Eastward on Longwood: Opposite the College
Massachusetts College of Pharmacy and Allied Health Sciences



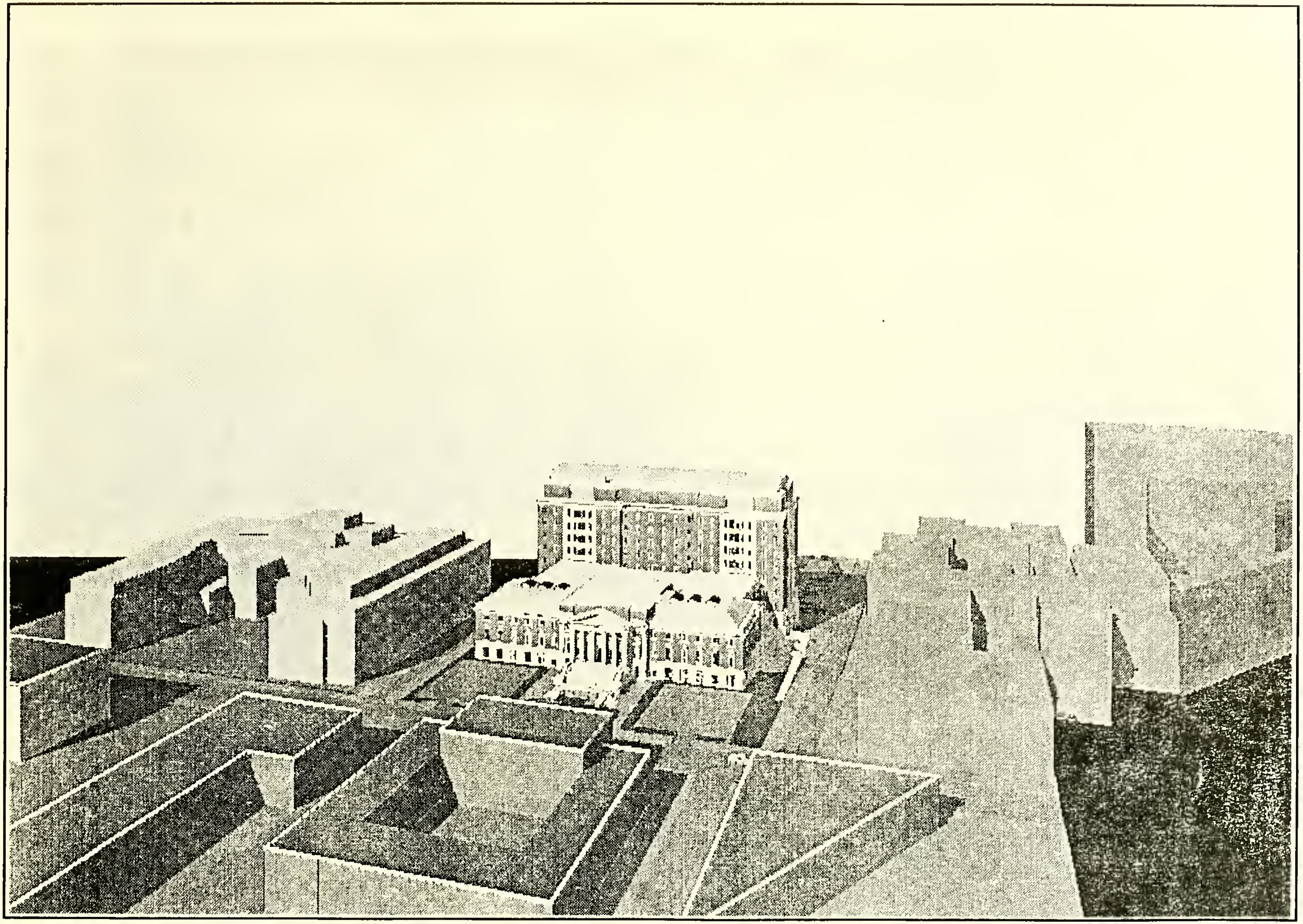
Longwood Avenue Frontage: LMRC and White Building
Massachusetts College of Pharmacy and Allied Health Sciences

Palace Road: Looking North from College Parking Lot Entrance
Massachusetts College of Pharmacy and Allied Health Sciences

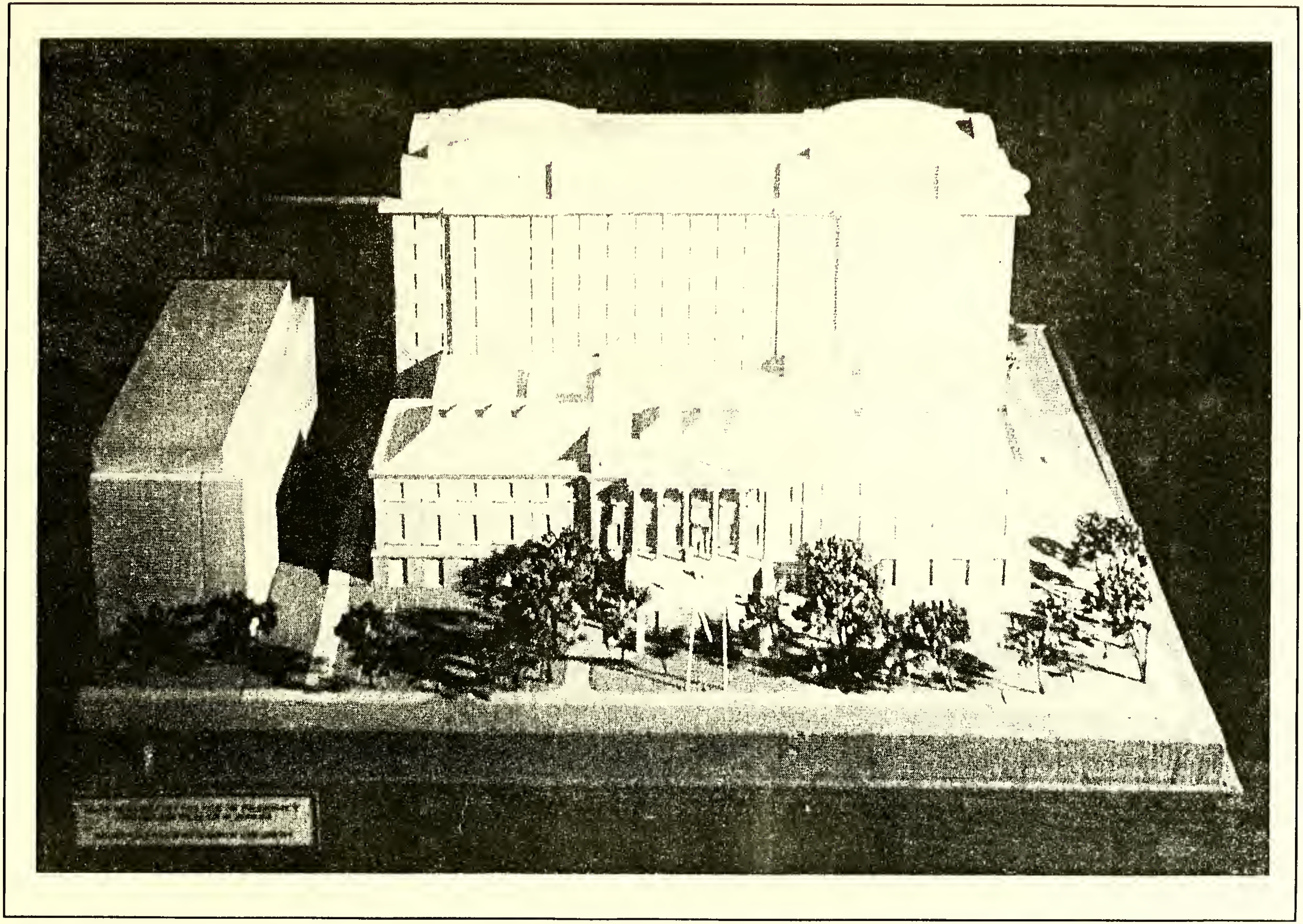


Palace Road: Looking North from Longwood (College on Left)
Massachusetts College of Pharmacy and Allied Health Sciences

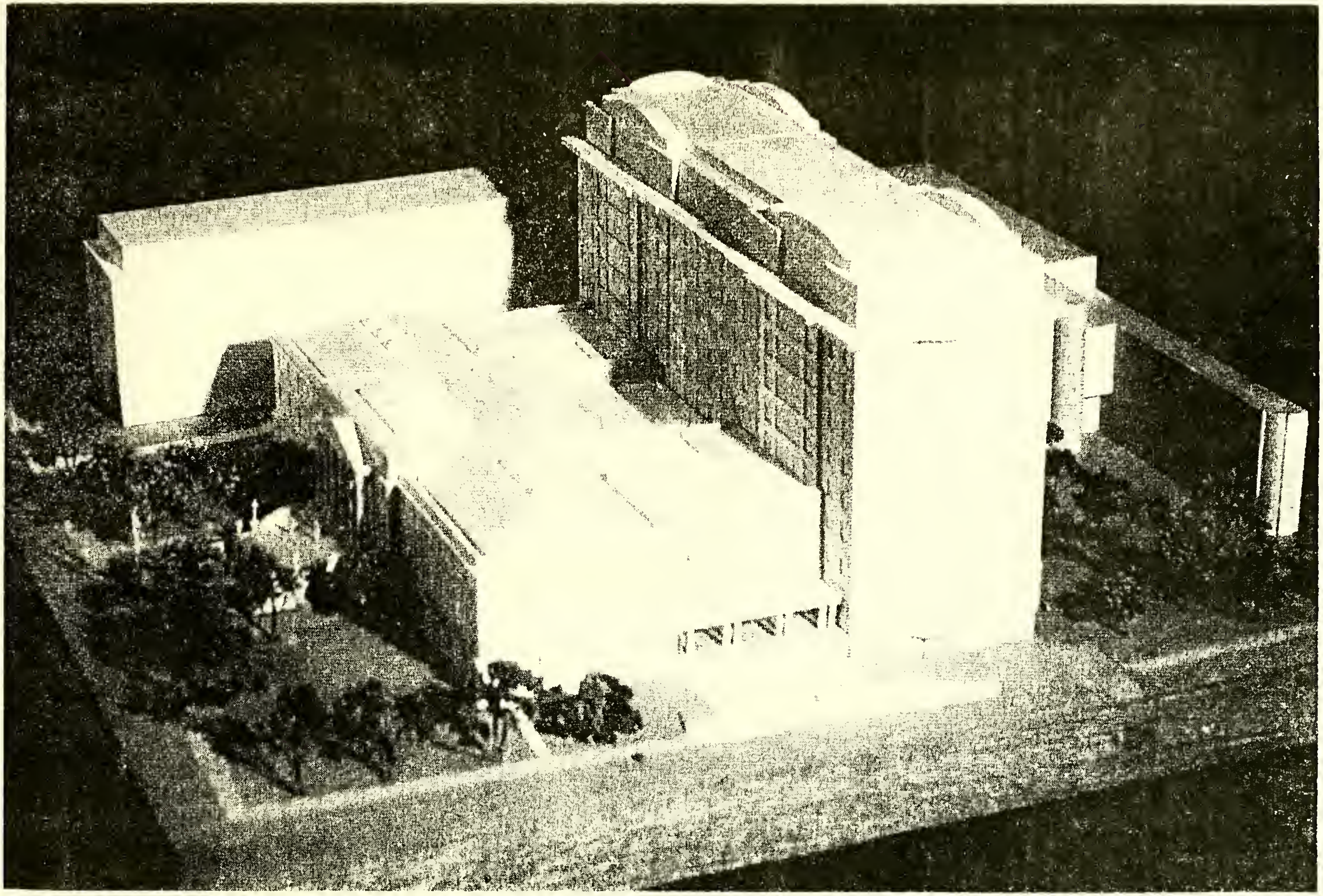
Palace Road Looking South Toward Longwood (College on Left)
Massachusetts College of Pharmacy and Allied Health Sciences



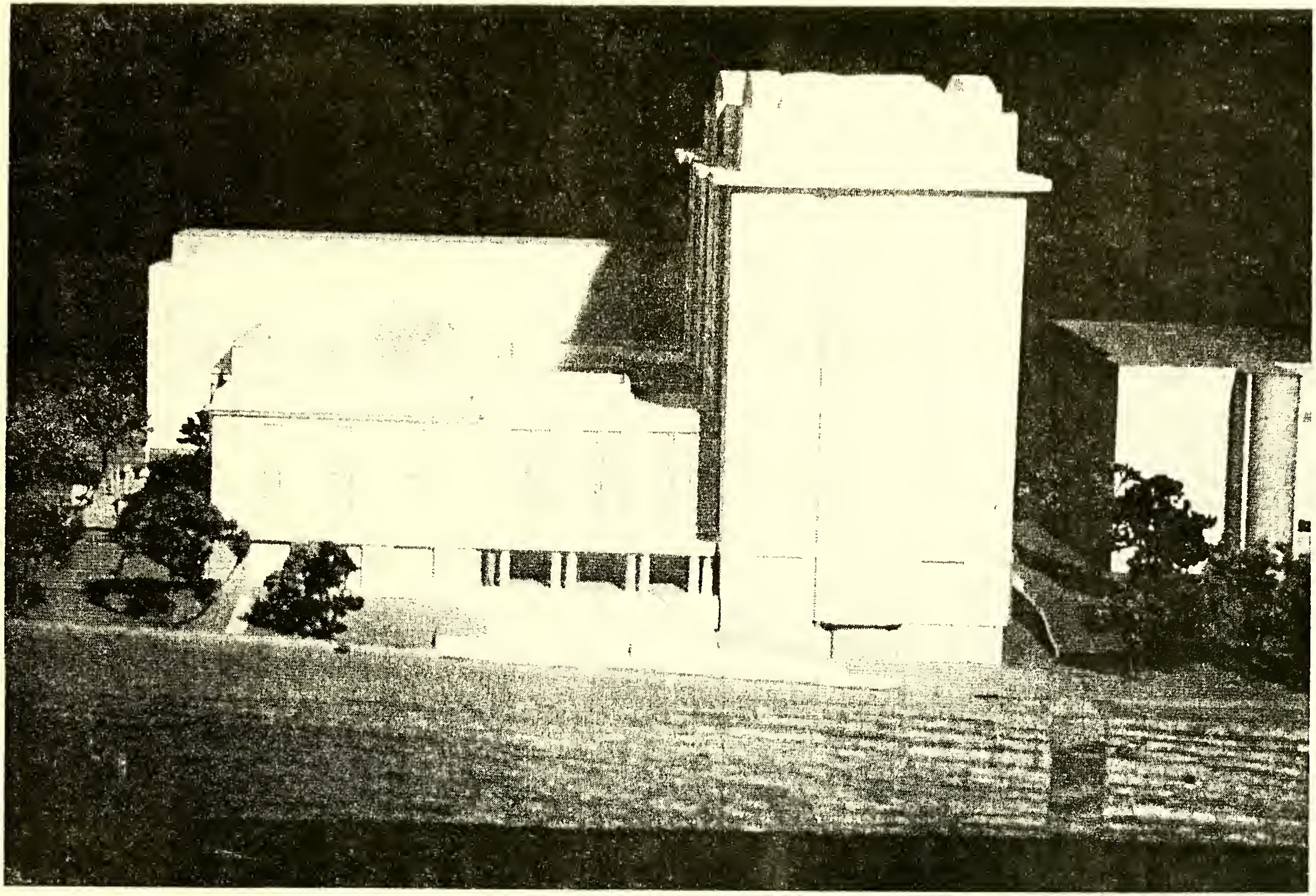
Aerial View of Project
Massachusetts College of Pharmacy and Allied Health Sciences



Study Model
Massachusetts College of Pharmacy and Allied Health Sciences



Study Model
Massachusetts College of Pharmacy and Allied Health Sciences



Study Model
Massachusetts College of Pharmacy and Allied Health Sciences

APPENDIX G

Project Support Letters to BRA

BOSTON PUBLIC SCHOOLS

BOSTON LATIN SCHOOL

FOUNDED IN 1635

MICHAEL CONTOMPASIS
Head Master
PAULA M. EDWARDS
CORNELIA A. KELLEY
PHILIP R. HABERSTROH
Assistant Head Masters

May 26, 1993

To Whom It May Concern:

I have met with Dean Hershenson of the Massachusetts College of Pharmacy regarding the proposed addition plan for the current college site. We have discussed the issues, which I raised regarding the project, as it impacted on the Boston Latin School.

All of the issues have been resolved to my satisfaction. Therefore, I support the proposed addition and renovations of the Massachusetts College of Pharmacy.

Very truly yours,

Michael Contompasis
Head Master

CT/ed

78 AVENUE LOUIS PASTEUR, BOSTON, MASSACHUSETTS 02115 • 566-2250, 566-2251 AREA 617

Building and Construction Trades Council of the Metropolitan District

AFFILIATED TO THE

BUILDING AND CONSTRUCTION TRADES DEPARTMENT

A.F.L.-C.I.O.

TERRITORIAL JURISDICTION

Arlington, Boston, Belmont, Brookline, Burlington, Cambridge, Canton, Chelsea, Dedham, Everett, Malden, Medford, Melrose, Milton, Norwood, Reading, Revere, Somerville, Stoneham, Wakefield, Westwood, Winthrop, Winchester, Woburn, and the Islands of Boston Harbor

HONE
2-0080

645 MORRISSEY BOULEVARD
SUITE 2
BOSTON, MA 02122-3520

May 25,1993

Mr. Clarence J. Jones
Chairman
Board of Directors
Boston Redevelopment Authority
Boston City Hall-9th Floor
Boston,MA 02201

Re: Massachusetts College of Pharmacy & Allied Health Sciences Project.

Dear Mr. Jones:

On behalf of the Boston Building Trades I am writing in support of the Master Plan of the Massachusetts College of Pharmacy & Allied Health Sciences and its proposed building program at 179 Longwood Avenue.

I have had occasion to meet with project proponents and receive a briefing on the project plans. It is my assessment that no significant neighborhood impacts will results from the project, and that comprehensive mitigation measures are planned for both construction management and traffic and parking management. Representatives of the College have committed to make this a union construction project.

This is the type of project which should go forward through permitting with all due speed. It is good for the City of Boston, the institutional/health care community and Boston Building Trades can benefit as well. I urge you to grant the approvals requested by the Massachusetts College of Pharmacy& Allied Health Sciences. We look forward to an early start to construction.

Sincerely,

Joseph W. Nigro

Joseph W. Nigro,Jr.
General Agent/Secretary Treasurer
Boston Building Trades Council

Mission Hill PCAZ
1530 Tremont St
Boston,Ma #02120

Massachusetts College of Pharmacy
& Allied Health Services
179 Longwood Avenue
Boston, Ma #02115

May 6, 1993

Attention: Benjamin R. Hershensen, Ph.D.
Dean of the College

Dear Dean Hershensen:

Representatives from the Massachusetts College of Pharmacy have presented the School Facilities Master Plan to the PZAC Board members of Mission Hill over the past several weeks.

Between representatives of the Pharmacy and the steering committee of the PZAC, several issues were discussed and addressed. For example: all pick-ups and drop-offs will take place inside the entrance to the new parking garage and not in front of building; with respect to the shadow effect on Latin School the Pharmacy promised to cooperate with the School Principal to alleviate any problems on snow days caused by the shadows; the agreed upon construction route will be monitored and the area will be wash-down frequently because of high pedestrain use both on Longwood Avenue and Palace Road.

The design of the buildings including the new design of both parking areas to either side of the front entrance has improved the appearance of the development and complements the location.

when all of the above information and final presentation went before the PZAC members, those members present supported the Pharmacy School project.

Sincerely,

Kelly Farquharson

Kelly Farquharson
Chairperson

David West

David West
Co-Chairperson

M A S C O

MEDICAL ACADEMIC AND SCIENTIFIC COMMUNITY ORGANIZATION, INC.

May 24, 1993

Mr. Clarence J. Jones, Chairman
Boston Redevelopment Authority
9th Floor
Boston City Hall
Boston, MA 02201

Dear Mr. Jones:

We wish to record our support for approval of the Massachusetts College of Pharmacy and Allied Health Sciences' ("the College") Institutional Master Plan, which includes several elements that will significantly enhance the College's ability to meet its academic and programmatic goals during the next decade.

The College is to be lauded not only for its consistent leadership role in the fields of pharmacy and allied health sciences, but also in its capacity as a good neighbor to adjoining institutions and the surrounding residential community. The development plans described in the Master Plan indicate a sensitivity to the built environment, and the public benefits delineated are evidence of this institution's long-standing commitment to being a responsible neighbor.

Sincerely,

Richard M. Shea, Jr.

Richard M. Shea, Jr.
Vice President

375 Longwood Avenue, Boston, Massachusetts 02215-5328 617 632-2310 FAX 617 632-2759

HMM Associates, Inc.
A Summit Company

Other Summit Companies:
WW Engineering & Science   WW Operation Services   Sigma Research Corporation